DOCUMENT RESUME

ED 396 707 IR 017 919

AUTHOR	Hawkes, Mark; And Others
TITLE	Educational Technology Dissemination Through Pioneering Partners: An Evaluation.
INSTITUTION	North Central Regional Educational Lab., Oak Brook, IL.
SPONS AGENCY	Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE	95
CONTRACT	RP91002007
NOTE	103p.
PUB TYPE	Reports - Evaluative/Feasibility (142)
EDRS PRICE	MF01/PC05 Plus Postage.
DESCRIPTORS	Annotated Bibliographies; Educational Development; *Educational Technology; *Partnerships in Education; Program Effectiveness; *Program Evaluation
IDENTIFIERS	North Central Regional Educational Laboratory; *United States (Great Lakes Region)

ABSTRACT

Pioneering Partners provides K-12 educators in the Great Lakes Region--Illinois, Indiana, Michigan, Minnesota, New York, Pennsylvania, Ohio, and Wisconsin--with educational technology development opportunities, coalition-building opportunities, dissemination skills training, connection to Greatlinks Net/Internet, and financial support to defray dissemination costs. The North Central Regional Educational Laboratory evaluated Pioneering Partners to determine the effectiveness of its efforts to expand the use of educational technology. The evaluation consisted of regional case studies, a four-page participant questionnaire (n=233, response rate 67%), document analysis of funded and nonfunded Pioneering Partners applications to identify areas for potential growth, and interviews used to augment inquiry on policy influence. Data shows that educational technology dissemination through Pioneering Partners is broad and far-reaching. On average, Pioneering Partners saw participation by students almost double, and participation by teachers and schools triple during the implementation of their dissemination plans. Close to 90% of respondents to the questionnaire considered Pioneering Partners either very significant or moderately significant to the success of the disseminating process. Major factors inhibiting dissemination are time and financial resources. Urban educators find dissemination more problematic and support from their supervisors and peers less abundant. (Contains 13 references; a survey cover letter and questionnaire and data summary tables are appended.) (Author/SWC)

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ED 396 707

Educational Technology Dissemination Through Pioneering Partners: An Evaluation

NORTH CENTRAL REGIONAL EDUCATIONAL LABORATORY

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NCREL

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Executive Summary

You have to have a team of people from different areas— teachers, community people, administrators, maybe even board of education members—working together having the same kind of goal. That's why Pioneering Partners is right on track.

—Tom Suter
Wheelersburg High School, Ohio

Pioneering Partners for Educational Technology began when the Council of Great Lakes Governors—representing Illinois, Indiana, Michigan, Minnesota, New York, Pennsylvania, Ohio, and Wisconsin—partnered with GTE North, Inc., to accelerate the use of educational technologies in K-12 classrooms. Recognizing that educational technologies make learning more productive for students while at the same time preparing them to enter a more technology-oriented workforce, Pioneering Partners has as its overarching goal the dissemination of innovative educational technologies developed for students by educators. The initiative not only recognizes "best practices" in educational technology, but also seeks to build participants' skills in disseminating those technologies. To accomplish this, Pioneering Partners provides educational technology development opportunities, coalition-building opportunities, dissemination skills training, connection to Greatlinks Net/Internet, and financial support to defray dissemination costs.

Evaluation Overview

The purpose of the evaluation of Pioneering Partners, conducted by the North Central Regional Educational Laboratory, is to provide stakeholders with timely information regarding the effectiveness of efforts to expand the use of educational technology through Pioneering Partners. Evaluation efforts are aimed towards understanding the dissemination process and outcomes among Pioneering Partners regionwide. The evaluation also assesses initial and long-term experiences of participants at the Summit.

The primary goal of the evaluation is to distinguish the outcomes of dissemination. Also of interest are:

- Understanding how the transfer of educational technology innovations occurs
- Determining the effort required to achieve technology adoption
- Identifying barriers to dissemination, how they affect implementation, and how they are overcome

A smaller, although significant, focus for the evaluation is the local, regional, and statewide policies facilitating the dissemination of educational technologies. Specifically, the evaluation seeks to determine if Pioneering Partners puts educators in a position to influence policy and, if so, at what levels.

Methods

Four primary methodological approaches are used that are both qualitative and quantitative. The case study approach was applied at four Pioneering Partners sites to provide a holistic perspective of technology use and dissemination and to give evaluation efforts a view of

the complex interrelationships that characterize dissemination. A second strategy was a participant questionnaire. The four-page questionnaire (administered to all 233 partners with a response rate of 67 percent) sampled participants' experiences on scope, depth, target(s) of dissemination, and on a number of other dimensions identified as critical by program staff. A third method employs document analysis on a broader scale than in the case studies. In this instance, document analysis is used to conduct a systematic review of funded and nonfunded Pioneering Partners applications. The analysis identifies a core of features and characteristics where the potential for growth through Pioneering Partners is greatest. A fourth and final method involves interviews, which, again, are distinct from those in the case studies and used to augment inquiry on policy influence. A summary of evaluation results are presented here.

The Growing Landscape of Technology in the Schools

Educational technology dissemination through Pioneering Partners is broad and far-reaching the data show. On the average, Pioneering Partners saw participation by students almost double, and participation by teachers and schools triple during the implementation of their dissemination plans. A remarkable seven-fold increase is encountered in terms of hourly technology use per student per week illustrating that not only are more students using educational technologies to learn, but they are using them with much more frequency. Furthermore, the sophistication of these technologies is at a higher level than before. While other efforts have focused on the development of educational technologies themselves, Pioneering Partners has concentrated its energy on deploying these technologies so that they quickly find and serve their intended audiences. This accessibility to educational technologies has answered the call for educational change made by educators, scholars, parents, and community leaders.

Pioneering Partners appears to be behind this achievement in dissemination. Close to 90 percent of the respondents to the questionnaire consider Pioneering Partners either very significant or moderately significant to the success of the dissemination process. The case studies document a number of anecdotes illustrating Pioneering Partners' central role in dissemination. This is evidence that Pioneering Partners is often the catalyst and continuing motivation for educational technology dissemination.

The Summer Summit As A Dissemination Resource

Perhaps the most productive resource for dissemination training for Pioneering Partners is the Summit. The Summit, held in the summer of each year, brings together new Pioneering Partners teams, state legislators, policy advisors, business leaders, and dissemination experts. Participants agree that the most common benefit they gain from the Summit is increased communication and interpersonal skills/knowledge. This access and knowledge helps partners disseminate their programs, work better with business, industry, and the media, and negotiate political issues within their own districts.

Time spent planning for dissemination is also an important element of the Summit for many respondents. One person noted, "If we [would have] developed a program and a plan to complete that program without the Summit, our goals would not be as well-defined . . . The Summit focused us." Another said, "My experience at the Summit . . . served to increase my awareness relevant to the importance of exposing our program to others."

Many respondents simply indicated that the Summit was "excellent," inspiring, or confidence building. Comments such as "The Summit was outstanding" were usual. Another participant noted that "the confidence-building by simply participating has helped considerably." Several participants also found they had used the grant writing and coalition-building skills the Summit helped them develop. One participant noted, "We have written three proposals . . . and we are writing more."

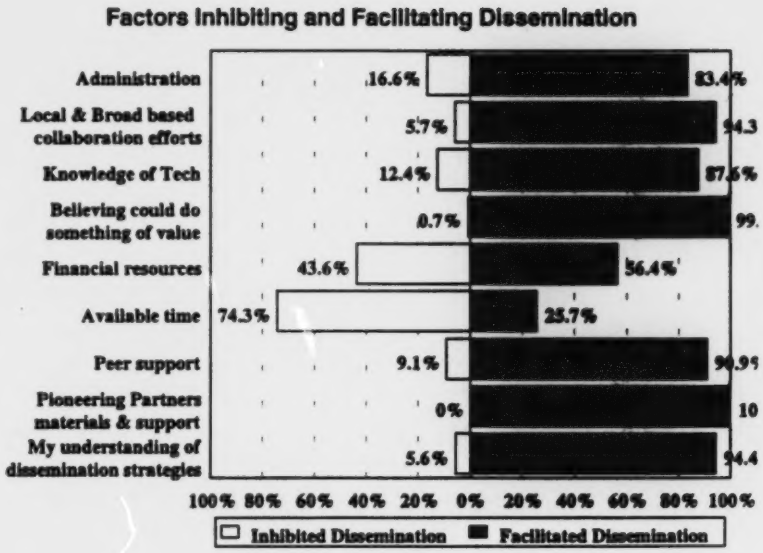

Figure 1

Challenges of Dissemination

As proficient as Pioneering Partner teams are becoming at disseminating telecommunications technologies, some hurdles remain. As Figure 1 illustrates, major factors inhibiting dissemination are time and financial resources.

Pioneering Partners members indicated that to implement their dissemination plans, a considerable amount of personal time had to be dedicated to the task. There was little release time provided by their schools or planning time allowed as a part of the school day (see Figure 2).

Urban educator teams face the greatest challenges. The evaluation clearly shows that urban schools face dissemination dilemmas not common to their suburban and rural counterparts. Briefly, urban educators find dissemination more problematic and support from their supervisors and peers less abundant.

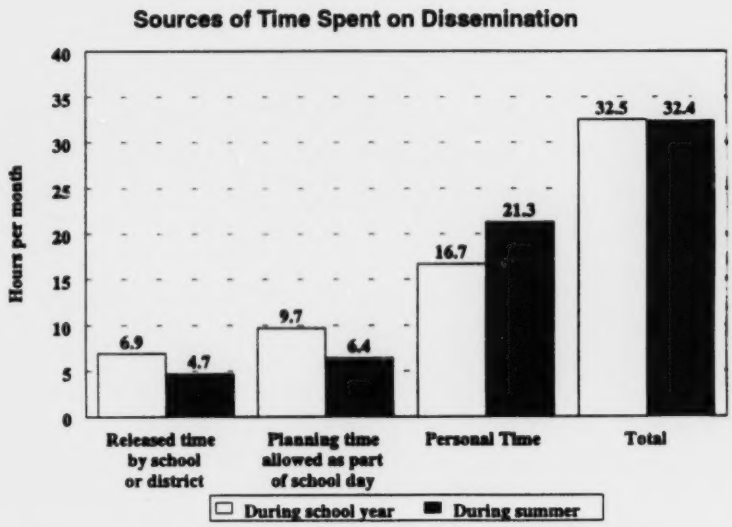

Figure 2

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Influences on Policy

A secondary role for the evaluation is determining to what extent educational technology policy is influenced by Pioneering Partner members. About half of the respondents to the survey indicate that through Pioneering Partners, they have improved their contact with state officials. This contact, survey respondents report, has resulted in local and regional policy changes. Some Partners indicate they have been involved in creating district policies or practices to improve teacher and student access to technology. For example, one respondent wrote, "Internet sites have now been made accessible in my county. . . . Finally the city office has started to allow teachers access."

Interviews with regional legislators and policy advisors revealed that they are all strongly supportive of the work Pioneering Partners does to create greater awareness of technology issues within the region. Policymakers agree that this project is useful because it allows them to talk directly to teachers, and find out what is going on at the grassroots level. Information from the teachers, they continue, helps them address barriers and gaps in educational technology needs.

One state official reports that involvement with Pioneering Partners has created an awareness for the need to link state distance learning programs. The official further reports that policymakers and planners have been able to parlay this awareness into increased funds out of the state budget for the delivery of distance instruction by educational telecommunications technology by over 80 percent during a time when budgets in their state were being cut. Another state official indicates that the governor has set in motion a plan to connect the Internet to each school in the state. The official explained that Pioneering Partners has helped contribute to his understanding of the importance of technology in schools.

Summary: Pioneering Partners, a Model for Business/School Relationships

Besides meeting the goal of disseminating educational technologies throughout the Great Lakes area, Pioneering Partners appears to have cultivated a relationship with its educator teams that serves them both quite well. Without exception, participating educator teams indicate that Pioneering Partners is instrumental in helping them disseminate their projects. Also, after three years, Pioneering Partners appears to have achieved a balance in technical training that matches the instructional needs of educator teams. This balance gives participants the confidence they need to realize dissemination results.

Still, some critical issues require attention. Understanding how better to serve the needs of urban educators is imperative. Encouraging quality applications that are more specific about learning objectives, goals, and outcomes and how the technology proposes to deliver those outcomes will provide educator teams with an essential self-evaluation framework to measure progress in dissemination. Using current research and literature on learning in development activities will provide a common language by which to communicate; assist educators in conducting their own research; and build connections between teacher, researcher, and policymaker who consider both empirical and anecdotal information critical to decisionmaking.

Working with schools to achieve more systemic and enduring dissemination results is also a challenge that lies ahead not only for Pioneering Partners, but for business, industry, legislatures, schools, and communities. Inasmuch as Pioneering Partners continues it's proactive support and intervention, it will continue to be a model for business/school relationships and for quality school reform not only in the Great Lakes region, but nationwide for some time to come.

Acknowledgements

A reporter once asked baseball legend Joe DiMaggio why he played so hard every night in every game. Joe replied in his low-key way, that it was because he never knew when there would be someone in the stands who had never seen him play before. Contrast this with evaluators, who toil as if the weight of the world was on their shoulders only hoping someone is watching.

While evaluators can control the validity and relevance of their work, they have less control over it's utility. And, although evaluators hope to find their efforts useful to the implementation of a program, or the guiding of a project, the ultimate power for that lies in the hands of the true clients and stakeholders.

In the case of the managing directors of Pioneering Partners, we are convinced that someone is in the stands, watching. At the outset of the evaluation, managers Brian Crosley and Mary Kinney were generous with their time. They responded to numerous questions about Pioneering Partners goals and accomplishments. They reacted to various drafts of the evaluation design so that it uniformly fit a variety of stakeholders information needs. They accommodated numerous requests to fill in information gaps and worked with the evaluation team towards a respectable return rate on partner surveys. Finally, they waited patiently for interim and final evaluation reports.

The evaluation team wishes to express it's thanks to Brian Crosley and Mary Kinney for their assistance in this evaluation. To the league of Pioneering Partners in the Great Lakes region, most of whom were anxious to share their experience with evaluators, we thank-you for your time and energy. To the extent that this evaluation report is able to assist the Pioneering Partners initiative in achieving its goals of school reform, we will feel that it is useful.

Finally, a debt of gratitude to our laboratory colleagues Sandi DiCola, Roger Chesswas, Mary Ann Larson, and Lenaya Raack for their indispensable assistance in reviewing, editing, and formatting portions of this evaluation report.

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Origins and Mission

When the Council of Great Lakes Governors began talks in the fall of 1991 about developing a partnership with GTE North, Inc., that would accelerate the use of technology in K-12 classrooms, the Pioneering Partners Era began. The initiative resulting from those talks, formally titled Pioneering Partners for Educational Technology, has as its goal the dissemination of innovative educational technologies developed for learners by educators. The initiative not only recognizes "best practices" in educational technology, but also seeks to build participants' skills in disseminating those technologies. To accomplish this, Pioneering Partners provides development opportunities at a Partnership in Educational Leadership Summit, coalition building opportunities, dissemination skills training, connection to Greatlinks Net/Internet, and financial support to defray dissemination costs.

Operation and support for Pioneering Partners is provided by GTE. GTE is the largest U.S. based local telephone company and the second largest cellular service provider in the United States, with the potential to serve almost 30% of the country's population. With a net income of $2.5 billion and revenues of $20 billion in 1994, the corporation is the fourth largest publicly owned telecommunications company in the world. GTE is also a leader in government and defense communications systems and equipment, aircraft passenger communications, directories and telecommunications-based information services and systems.

While GTE supports and facilitates the Pioneering Partners initiative, the Council of Great Lakes Governors is the oversight body for the project. The Council of Great Lakes Governors is a private, non-profit organization devoted to working cooperatively on public policy issues common to its eight member sates: Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. The Great Lakes governors share a dual stewardship—responsibility for both the world's largest source of fresh water and the industiral heartland of North America. The Council was formed in 1983 to coordinate this stewardship of the region's economy and environment. In particular, the governors wanted a forum to discuss the problems each faced during the severe recession that hit the Great Lakes states during the early 1980s, turning the region into what many called the "rustbelt." The governors also wanted to continue to build upon the successful clean up of the Great Lakes begun a decade and a half earlier. With this new union between GTE and the Council, both had theisights set on efforts to improve instruction within the Great Lakes states.

In March 1992 the first Pioneering Partners applications were distributed with a cover letter from each state's governor to schools throughout the Great Lakes region. To evaluate the applications, the governors appointed a 16-member Advisory Council. Close to 200 applications were received, and from these the Council selected 24 teams to participate in the first year of the program. The 24 teams—

three teams from each state—represented each of the eight Great Lakes collaborative states. For each of the last three years, Pioneering Partners has funded 24 educational technology dissemination teams in the Great Lakes region; a fourth year of application distribution and review is under way.

Educational technology projects submitted to Pioneering Partners by educators employ a wide selection of technologies: computer laboratories engage students in instruction on subjects ranging from phonics to geography; an array of telecommunications technologies, including two-way audio/visual fiber optic and copper cable, facsimile, satellite, and cellular and video telephones, allows students to communicate with peers, legislators, and sources sometimes thousands of miles away; local area networks (LAN's) are established to broaden technology access; laptop computers and calculators are used to employ unique learning strategies; and scanners and high resolution monitors are used to produce "electronic art," which eventually finds its way into video production.

Winning educator teams are encouraged to share these innovations so other educators can replicate them. The primary beneficiary of these endeavors is intended to be the students, who should find learning in a technology-oriented educational system much more meaningful. Secondary benefactors are intended to be the educators—who now engage their students at a higher level of thinking and prepare themselves to access a greater assortment of information—and the communities in which the schools reside. These communities find their students more prepared to enter a technology-oriented workforce.

Evaluation Overview

To conduct the evaluation, GTE retained the North Central Regional Educational Laboratory, a not-for-profit laboratory in Oak Brook, Illinois, committed to the development and delivery of educational products and services to the K-12 community throughout the North Central Region. The major purpose of this evaluation is to provide the Council of Great Lakes Governors and GTE with timely information regarding the effectiveness of steps taken to spread and improve the use of educational technology through the Pioneering Partners initiative. Efforts are made to understand the dissemination process and outcomes among Pioneering Partners regionwide. The evaluation also assesses initial and long term experiences of participants at the Summit.

The primary goal of the evaluation is to distinguish the outcomes of dissemination. Two measurable indicators of dissemination are its breadth and degree of manageability. The evaluation therefore seeks to understand how the transfer of educational technology innovations occurs and the scope of effort involved. Also of interest are the barriers to dissemination, how they affect the goal of implementation, and how they are overcome. To address these issues and others, the following questions guide the evaluation:

1. What are the intended outcomes of the Pioneering Partners initiative and what criteria exist to determine if they were achieved?
2. What key events, processes, and attributes describe the implementation of the Pioneering Partners technology initiative?
3. What processes/supports do participating schools and other stakeholders feel are essential to the optimal dissemination of innovative programs and technologies in their region? What role does the Summit play in providing and sustaining these strategies and supports?
4. In what specific ways are schools participating in the Pioneering Partners initiative employing their financial awards?
5. Does the Pioneering Partners initiative provide an adequate mechanism to ensure that innovative models of educational technology become standard practice in multiple classrooms?
6. How willing are schools to adopt technological innovations? What are their motivations? How does adoption improve educational technology integration and implementation?
7. What policies, systems, and procedures need to be refined and/or established in order to maximize program implementation and technology use in the schools?
8. What is the range of the dissemination process and how far beyond initial contact does effect follow?
9. What common criteria do selected schools share, and can a common core of features identify schools likely to benefit from or excel in the Pioneering Partners program?

In addition to assessing the impact, process, and quality of dissemination, a smaller, although significant, focus for the evaluation is the local, regional, and statewide policies facilitating the dissemination of educational technologies. Implementing technology requires systemic thinking of the education delivery; and as much as Pioneering Partners can inform the decisions policymakers face, the more likely that laws favoring technology presence and use in the schools will be legislated. Specifically, the evaluation seeks to determine if Pioneering Partners puts educators in a position to influence the policymaking processes through a classroom, grass roots way, and at what levels partners are affecting policy in their communities and states.

Methods

Four primary methodological approaches that were both qualitative and quantitative in nature were used to respond to the range of questions this evaluation presents. These methods were employed to both respond to the evaluation questions and to be sensitive to unintended effects that might emerge from study of the program. The first of these methods was the case study, which utilize the following tools: Document analysis was a key strategy that allowed evaluators to review school technology and application plans. Interviews with key stakeholders were necessary to understand the micro and macro structures that support fulfillment of the Pioneering Partners program. Interviews were conducted with individuals executing a number of roles including students, teachers, parents, building and district level administrators, library media and technology specialists, school board members, governors office personnel, state legislators, Pioneering Partners advisory board members, and higher education faculty. Focus groups were a cost-effective strategy for convening small groups of people (usually 4 to 5) to address evaluation questions. Groups were assembled according to natural affiliations (students with students, teachers with teachers, etc.) so the dialogue followed relevant paths for all participants. Observation of key events were used to evaluate the range and effects of technology use. Classroom events were largely the target of observation, which allowed evaluation team members to see student use of the technology innovations, the products being disseminated from classroom to classroom, and the dissemination outcomes.

The case study approach allows for a more holistic view of technology use and dissemination and provides the evaluation with a view of the complex interrelationships that characterize dissemination. The case studies are introduced and presented later in the evaluation report with an accompanying cross-case analysis.

A second strategy was a participant questionnaire which provided a broad view of the Pioneering Partner experience. The four-page questionnaire (see Appendix A) sampled participants' experiences on scope, depth, and target(s) of dissemination and on a number of other dimensions identified by program staff. The questionnaire proved to be a reasonably inexpensive and unobtrusive way to gather a large amount of data. Survey methods and the survey results are discussed further in the next section of the evaluation report. Steps taken to ensure the reliability and validity of data are discussed with the presentation of evaluation results.

A third primary method employs document analysis on a broader scale than in the case studies. In this instance, document analysis was used to conduct a systematic review of funded and nonfunded Pioneering Partners applications. The analysis was conducted to identify a common core of features and characteristics where the potential for growth through Pioneering Partners is the greatest.

A fourth and final method involves interviews, which again, were distinct from those in the case studies and used to augment inquiry on policy influence. In this case, 10 individuals

in policy leadership positions were interviewed to determine if Pioneering Partners enables educators to influence the policymaking process, and, in what way policy is being shaped, if the influence is present.

The remainder of the report is organized so that the data collected by the evaluation are presented and discussed, beginning with forced choice survey data, followed by responses to open-ended questions then to the case studies. Discussion on the topics of Partner selection and policy precede a final synthesis and recommendations.

Evaluation Findings

Constructing and Analyzing the Questionnaire

The questionnaire was a method designed for achieving broad feedback from Partners, while the aim of the case studies was to provide more depth into dissemination inquiry. (Cronbach, 1982). The questionnaire (see Appendix A) was constructed to solicit descriptive, process, and outcomes information from respondents. Descriptive information provided facts on the partners' roles within the educational systems, the type of technology they were disseminating, and the curriculum areas and grade levels targeted. Process inquiry borrowed from the research of Ely (1990) and Hall et al. (1975). Ely's *Conditions Facilitating the Implementation of Educational Technology Innovations* provided the questionnaire with validated guidelines for successful technology implementation. Respondents indicated on a three-point scale the conditions that were present to prompt the implementation of the educational technology at their schools. Respondents also indicated the conditions that were present for implementation at adopting locations. Hall et al.'s *Framework for Analyzing Innovation Adoption* supplied a standardized archetype for determining levels of educational technology use. This framework, with levels ranging from a lack of knowing that the innovation exists to an active and highly effective use of it, gathered feedback on educational technology use achieved by adopting locations. Hall et al.'s *Levels of Use* (LoU) operationally defines various states of innovation user behavior so that adopting locations' use of the technology can be ascertained. Outcomes information identified the breadth of impact in terms of numbers of students, teachers, and schools participating.

Questionnaires were mailed to each of the 233 Pioneering Partners identified over the three-year existence of the program. A letter of introduction accompanied the survey, which explained the purpose and scope of the evaluation and the necessity of the respondents' participation. A postage-paid return envelope also accompanied the questionnaire. Three follow-up contacts were made with respondents to ensure the return of all the questionnaires: the first by electronic mail and the following two by telephone. Near the end of the survey return period, an effort was made to ensure that all partnerships were represented in the parameter. On several occasions, questionnaires were administered via telephone. Upon final tally, efforts showed a 67 percent (N=147) response rate was achieved, representing 93 percent (N=67) of the funded partnerships over the last three years. These percentages are factored with a Pioneering Partners attrition rate of 5 percent, which was determined by the number of undelivered return surveys and reports from colleagues of an individuals departure from the school at which they served a Pioneering Partners.

Analysis of questionnaire data was first done to determine aggregate outcomes. When it was determined that data might show interesting results when stratified by characteristics of location (urban, rural, suburban) and year funded (1992, 1993, 1994), analysis continued. Statistical tests, including independent T-tests

for means and independent Z-tests for percentages, were conducted at the 95 percent level of significance, a point at which evaluators were willing to conclude that significant values were atypical and not due to chance error. The results of the survey are discussed below accompanied by relevant graphics. Appendix B provides summary tables of data stratified by location, where most margins of significance between location and year occur. The next section provides descriptive and interpretive narrative of the data presented by Pioneering Partners. Graphics accompany the narrative to visually represent some of the data produced by the questionnaire.

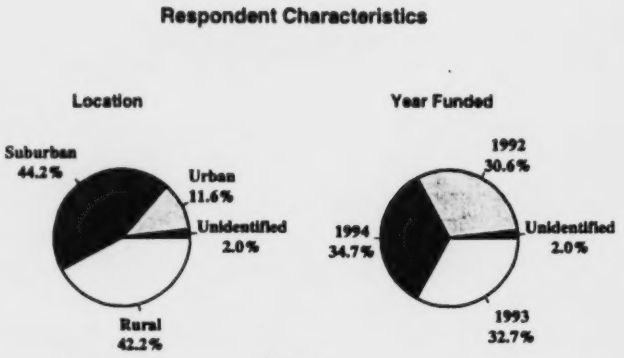

Figure 1

Demographic Attributes

Figure 1 shows survey respondent characteristics. Stratified by location, the largest portion of respondents represent suburban schools (44.2%) followed by rural schools (42.2%), and a smaller proportion of urban schools (11.6%). Divided by year, respondents are fairly equally represented in all three years.

The nonexclusive categories in Figure 2 show that the largest fraction of dissemination efforts target the whole student body. Otherwise, each grade level (K-5, 6-8, 9-12) is fairly evenly represented as dissemination targets.

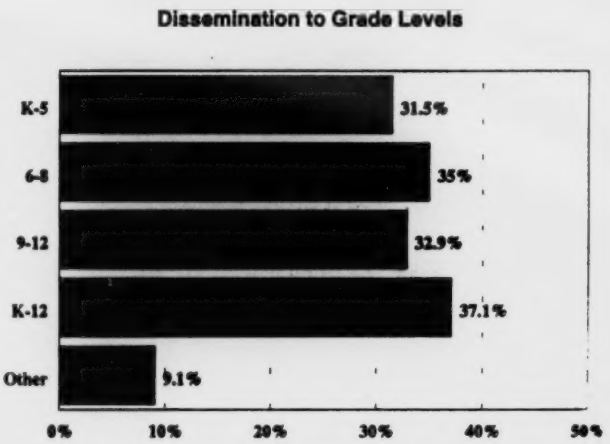

Figure 2

Figure 3 shows that the subject areas of math (52.3%), science (51.5%), and English (48.5%) are the most frequently disseminated. Music (19.7%) is a least disseminated subject area. When analyzed from year to year, there is a wide fluctuation in the number of subjects funded. However, several subjects show significant net decreases in funding over the three years. For instance, 62 percent of the projects in 1992 were math related, but in 1993 only 55 percent were, and in 1994 the figure dropped to 43 percent. These figures

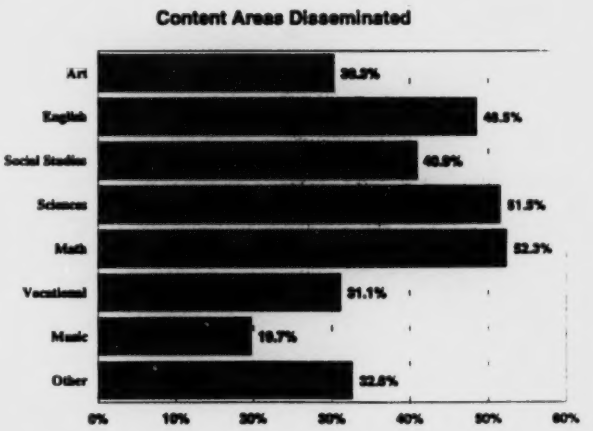

Figure 3

represent a 19 percent net decrease in the amount of math-related projects funded over the course of the three years. Science-related projects dropped 23 percent from 1992 to 1993, but rose 10 percent again in 1994, a net decrease, however, of 13 percent. Funded art projects show a net decrease of 17 percent; social studies projects, a net decrease of 5 percent; and music projects, a net decrease of 6 percent. Subject areas showing increases in funding are English (6%) and vocation-related initiatives (3%). It's likely that in the case of the decreases, fewer projects are aligned with multiple subject areas and there really has been no decrease in the amount of instruction dedicated to these subjects. However, these trends are somewhat surprising given Goals 2000 legislation, which emphasizes the math and science curriculums.

Figure 4 below shows that the type of technology most frequently disseminated is classroom computers (77.5%), or applications for classroom computers. Telecommunications technologies (56.6%), including Internet use, electronic mail, cellular telephone and facsimile transmission, and interactive two-way audio/videoconferencing are a close second, followed by computer labs (53.5%). Over the three-year administration of the Pioneering Partners program, the data show a drastic decline in the funded projects employing video production (13%) and laptop/calculator (19%) technologies. A smaller decline (7%) is shown in the construction of local area networks. Holding steady is dissemination of applications for classroom computers. The dissemination of telecommunications technologies (16%) have been of increasing interest for Pioneering Partners.

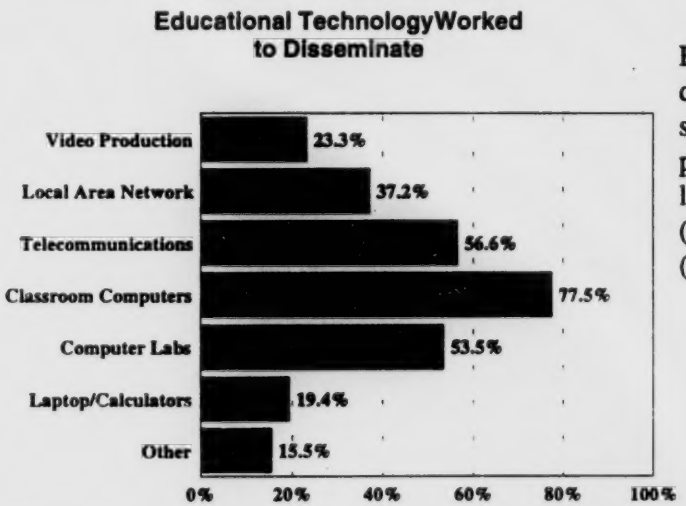

Figure 4

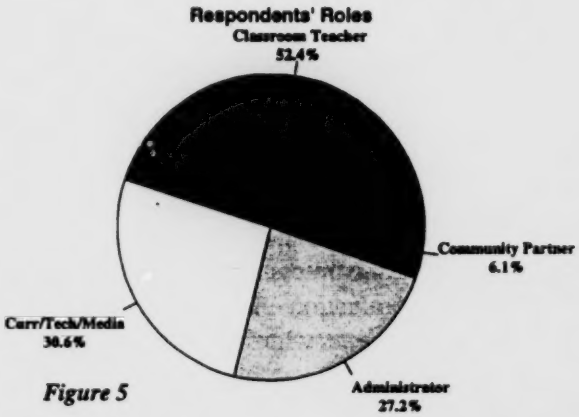

Figure 5

Figure 5 illustrates the roles of the respondents in their respective educational system. Teachers are the most frequent participants (52.4%) followed by curriculum, technical, or media specialists (30.6%), followed by administrators (27.2%).

Facilitating and Inhibiting Factors

When asked what factors inhibited or facilitated dissemination, respondents indicate (Figure 6) that Pioneering Partners' materials and support, and believing they could do something of value are the greatest facilitators of their dissemination efforts. Other factors such as collaborative support, peer support, and understanding of dissemination technologies also rate high as facilitators. And, predictably, lack of available time and financial resources are considered the largest inhibitors. When differences between urban, rural, and suburban respondents on this question are investigated, those factors inhibiting dissemination are made more apparent, especially for urban and rural schools. Figure 7 on the following page shows that both urban and rural respondents point to administrators as a significant deterrent to dissemination efforts. Further, of the urban respondents who indicate that administrators inhibit the dissemination process, 80 percent said that administrators are very inhibiting, very inhibiting being the highest alternative on a three-point scale including somewhat and minimally inhibiting. Figure 8 demonstrates that urban respondents find their experiences in building local and regional collaboratives marginally productive to their dissemination efforts. Figure 9 shows how the lack of financial resources inhibite dissemination of educational technologies for rural schools. Figure 10 illustrates that the lack of available time is more inhibiting for urban than for rural educators. Figure 11 is an especially poignant illustration of the lack of peer support educators in urban schools face. Figure 12 presents an additional barrier that urban educators say inhibits their dissemination activities: their knowledge of dissemination strategies. Implications for these data will be discussed further in a summary section to this report. But, clearly, urban schools, face dilemmas in dissemination not common to their suburban and rural counterparts. Stated briefly, urban educators find dissemination more problematic and support from their supervisors and peers less abundant.

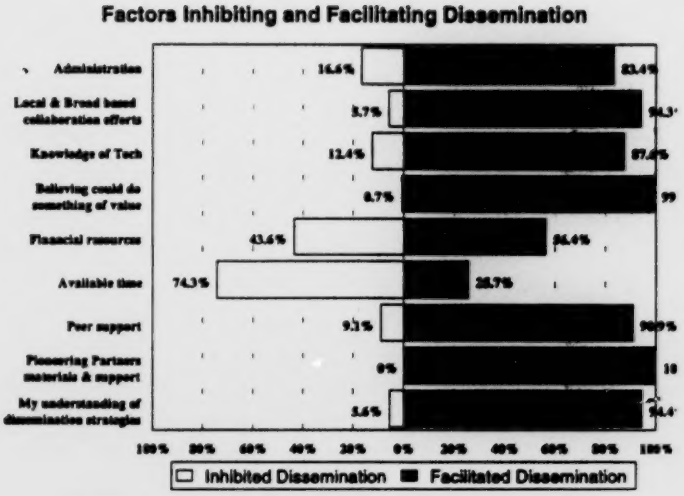

Figure 6

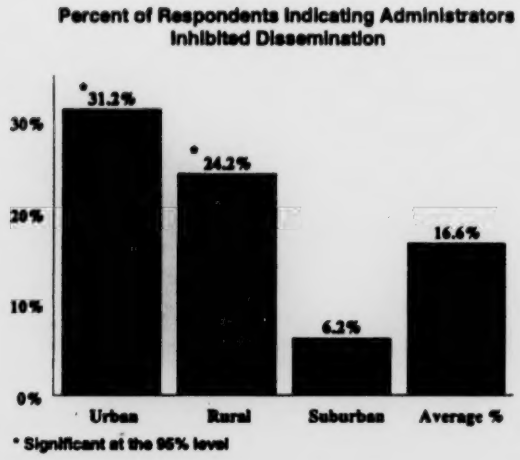

Figure 7

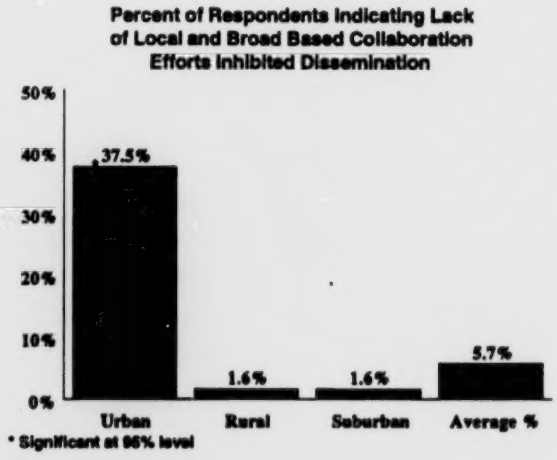

Figure 8

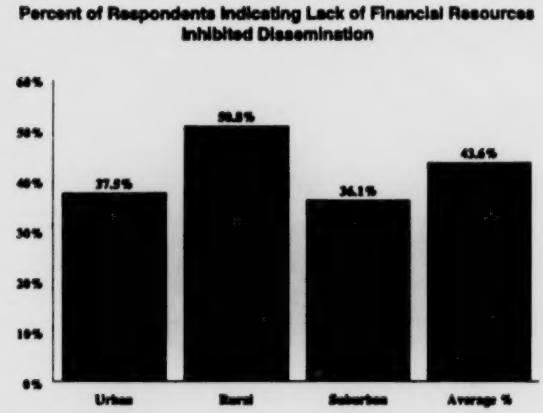

Figure 9

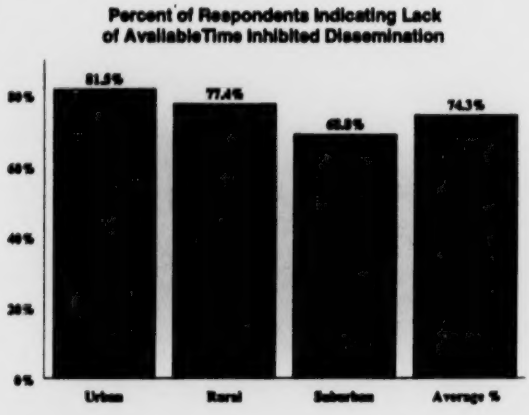

Figure 10

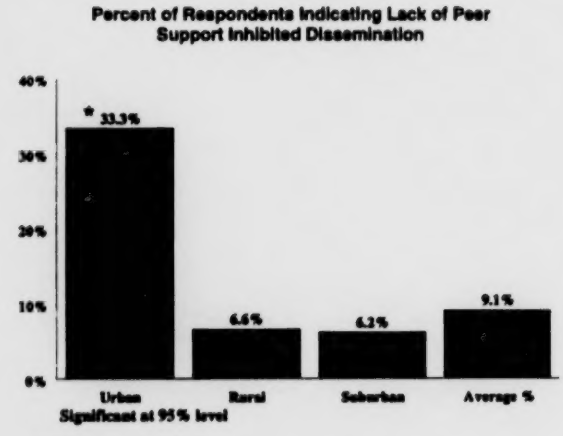

Figure 11

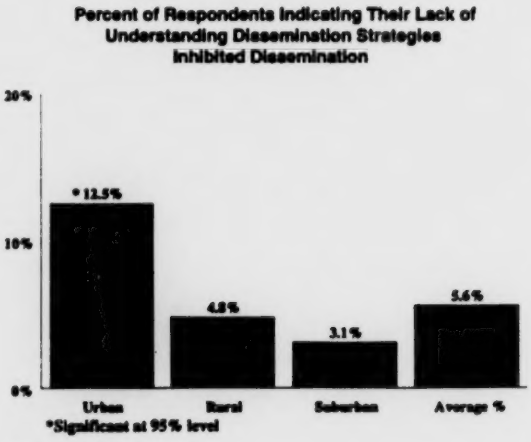

Figure 12

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Figure 13 summarizes respondents answers to the question, What conditions were present that prompted interest and implementation of the educational technology at your school? Respondents were given several alternatives that they rated on a scale of one to three: 1—not a factor in interest/implementation; 2—a moderate factor in interest/implementation; and 3—a major factor in interest/implementation. Those factors most contributing to the interest in and implementation of new technologies at Pioneering Partner sites are dissatisfaction with the status quo (2.6), leadership and continuing support (2.6), and commitment by key implementors and stakeholders (2.5). Respondents generally said that few of them are forced to participate (1.2) and that their interest and implementation is driven least by the availability of rewards or incentives (1.7)

Figure 14 shows the responses to the question of conditions present in generating the interest and implementation of educational technologies at adopting locations. Dissatisfaction with the status quo (2.6) still heads the list. However, opportunities available (2.4) and leadership and continuing support (2.4) runs a close second as the conditions most responsible for initiating change. Rewards and incentives (1.8) and being forced to participate (1.2) are the conditions least present for initiating change. The only difference between the groups appears to be that the respondents indicated that commitment by key implementors, and leadership and continuing support are a greater factor in prompting implementation of the technologies for themselves than for their adopting locations.

Conditions Prompting the Implementation of Technologies for Pioneering Partner Sites

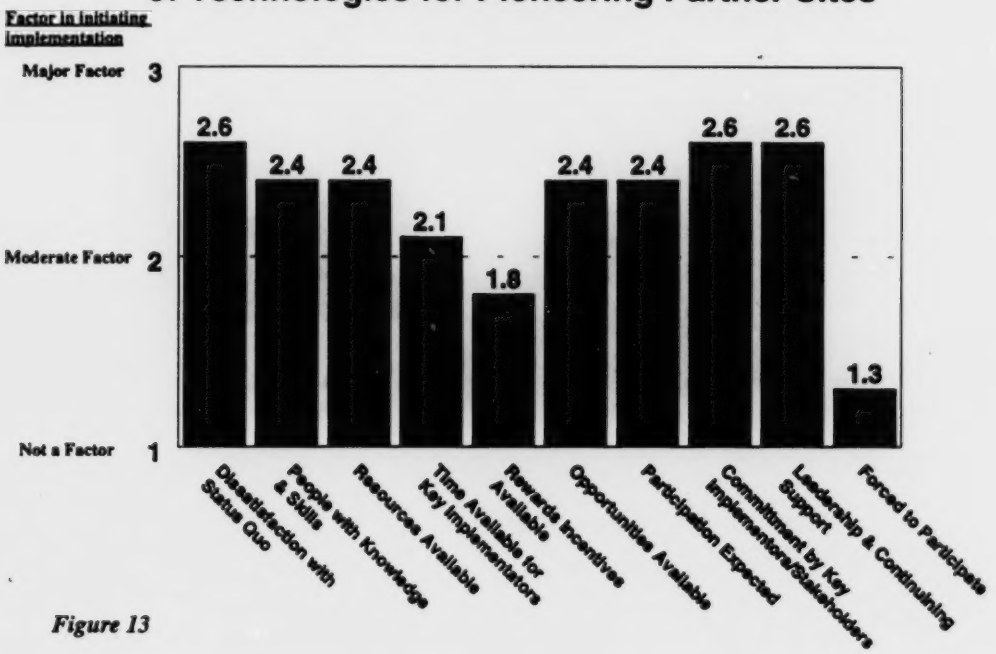


Figure 13

Conditions Prompting the Implementation of Technologies for Pioneering Partner Adopting Locations

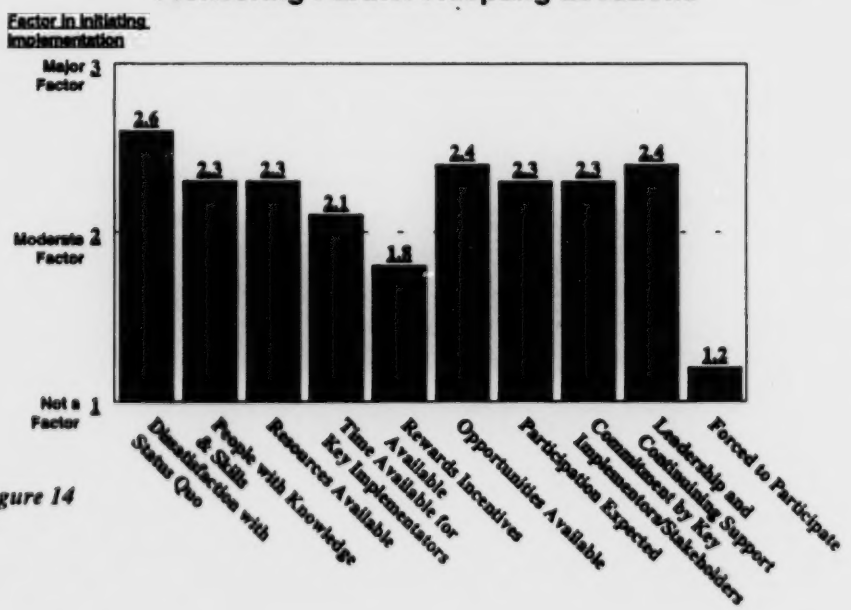


Figure 14

Ascertaining Levels of Use

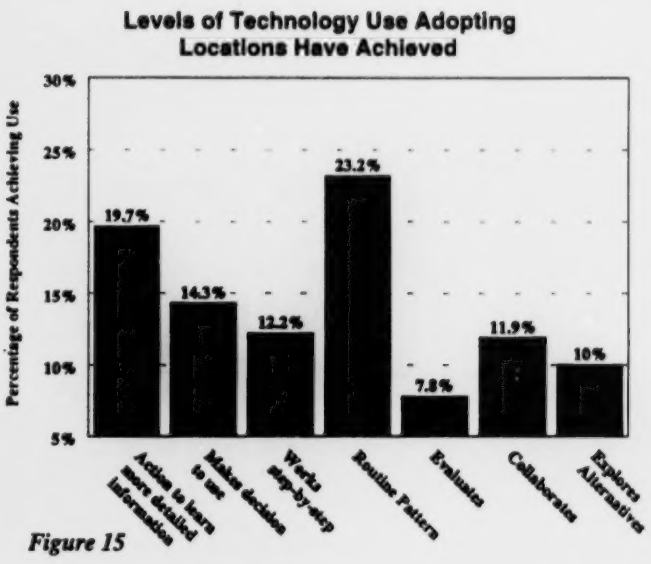


Figure 15

Question five of the survey asks respondents to indicate the highest level of technology use their adopting locations have achieved. These levels, identified by Hall et al., are hierarchically listed and defined so that adopting locations will have achieved one or more of the levels. Levels of use are listed in the questionnaire in Appendix A and list in order from left to right in figure 15. The majority of adopting locations appear to have achieved a routine pattern of use. A significant number of adopting locations are still taking action to learn more detailed information about the technology (19.7%). Smaller proportions of the adopting locations are collaborating to adapt the technology to more individual needs (11.9%), exploring alternatives for it's use (10%), or, evaluating the technology (7.8%). When responses to this question are examined over the course of the three years of Pioneering Partners' implementation, surprising results emerge. While one would suspect that greater levels of use would be achieved as the variable of time increases, the inverse is true in several cases according to Pioneering Partners data. The 1994 partners indicate that the adopting locations with which they are working are most active in learning about the technology and are determined to use it. They also report that the same locations are also achieving equal or greater levels of technology use than their 1992 and 1993 cohorts in collaborating to adapt the technology to meet individual needs and in exploring alternatives to broaden the technologies use. Several explanations are possible for this event. One could be the unique ability of adopting locations to collaborate and explore. Another explanation could be the nature of the technology and the ease of modification it presents. A third explanation could speak to the quality of the training 1994 Pioneering Partners received.

When partners were asked to indicate the amounts of time they dedicated to dissemination activities and the sources from which it came, data in figure 16 were produced. The histogram shows that personal time is the most frequent source from which educators draw to accomplish their dissemination activities. Far less time is provided as part of the school day or as released time by the school or district. The data, however, are skewed by the wealth of time suburban participants have as opposed to their urban and rural counterparts. Figure 17 shows that urban teams, and to a lesser extent, rural teams, have very little released time that is provided by their schools. Compared to suburban teams (47%), a much larger proportion of urban team members'(66%) and rural team members' personal time (55%) is dedicated toward achieving dissemination results.

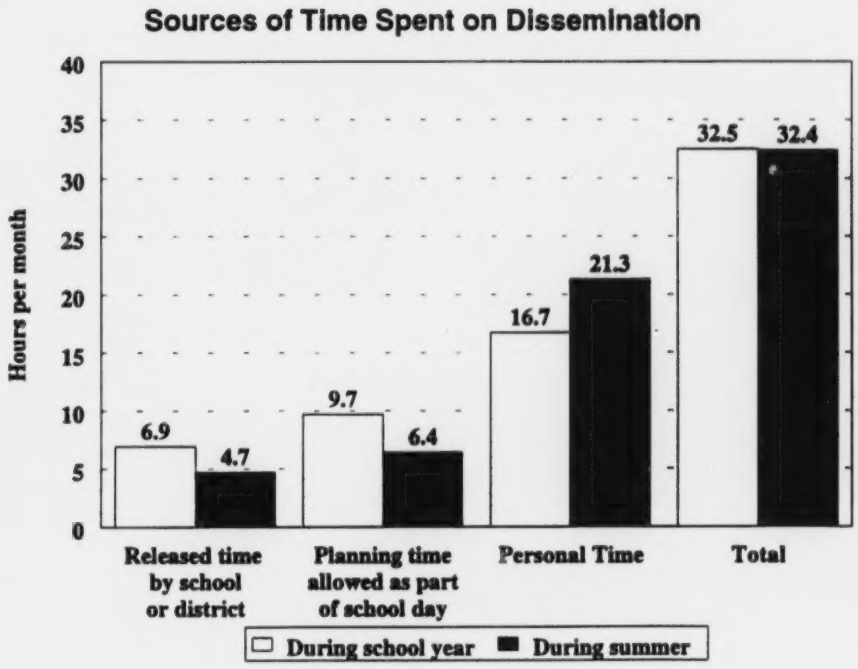


Figure 16

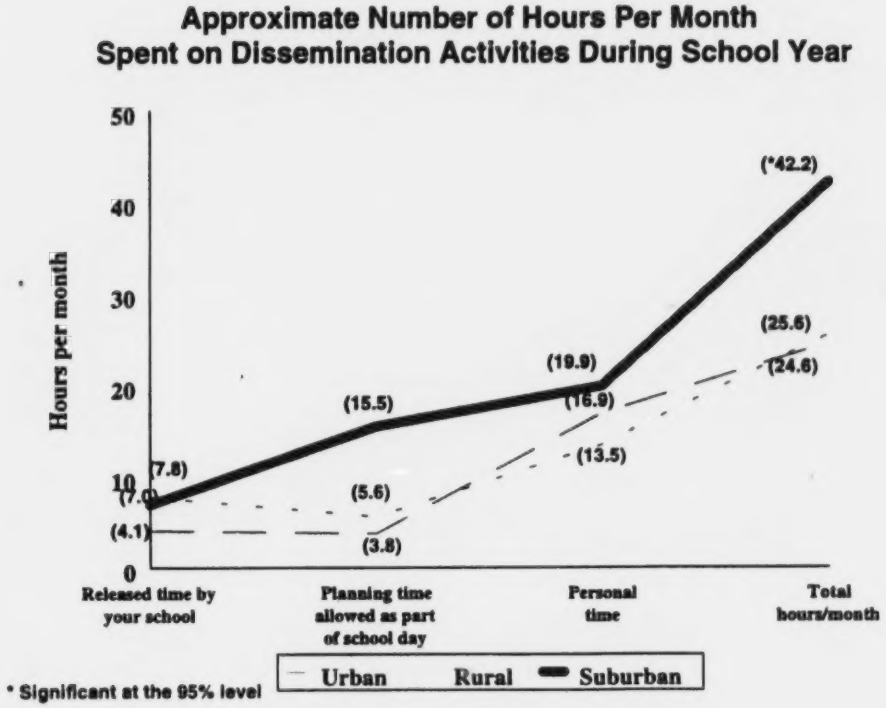


Figure 17

Figure 18 illustrates the proportion of Partners' total time spent on various activities of dissemination. Most of the time is spent on awareness (21.7%) and planning (21.5%) activities, while the least amount of time is spent on evaluation (7.8%). If these activities, like Hall et al.'s levels of technology use, are intended to be linear—so that obtaining funding generally preceded awareness, which generally preceded planning to evaluation consultation, and finally to adoption—then here, too, an interesting inverse of results is shown. Data from Partners funded in 1994 show that a greater proportion of them have achieved actual adoption (19.7%) than have 1992 (18.2%) and 1993 (8.1%) Partners. Although it might be the case that the activities of dissemination occur more concurrently than linearly, the level of adoption achieved by 1994 does present an aberration.

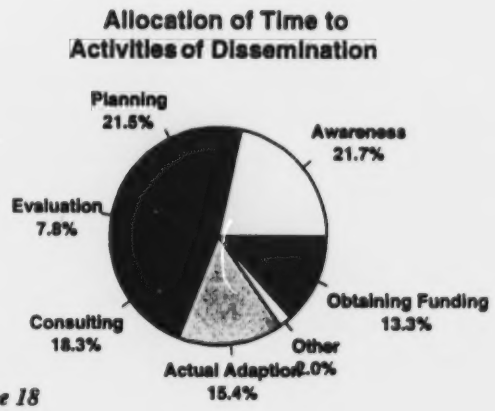


Figure 18

Question seven of the survey is yet intended to be an additional inquiry into the level of educational activity at adopting locations. The question asks the Partners to rate the degree of activity at each of these levels presented in figure 19: 1 equals not active, 2 equals somewhat active, 3 equals moderately active, and 4 equals very active. While respondents indicate that the adopting locations with which they work engage quite robustly in all levels of activity, they are most active in seeking information about the technology (2.96) and discussing its outcomes (2.91) while being least active in the technology's assessment (2.58).

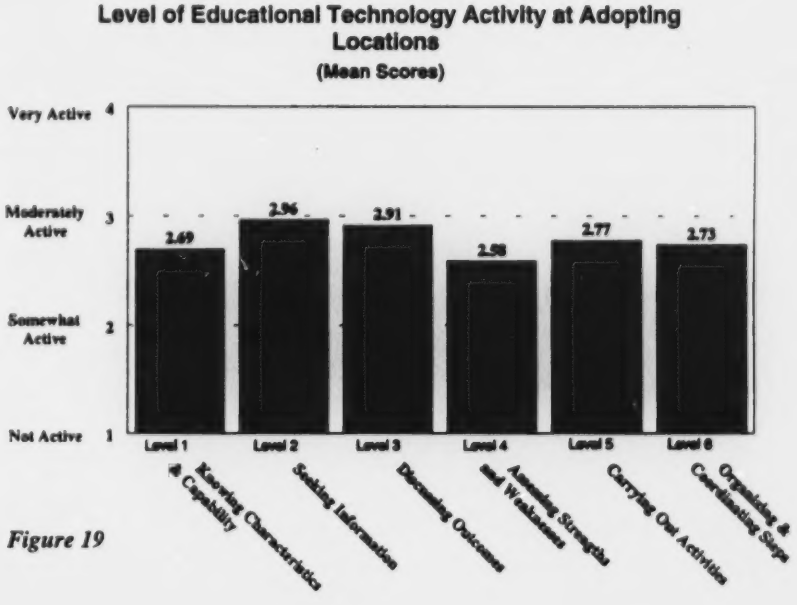


Figure 19

Figure 20 illustrates that most partnerships make modifications in the timelines and/or budgets (46.3%) of their initial plans. A fairly significant body of respondents found themselves broadening their goals (25.4%), and a smaller number of partners either followed most aspects of their plan (12.3%), followed their plan entirely as developed (6.5%), or scaled back their goals due to their unrealistic nature (5.8%). Data with year funded as a variable show that the longer partners persist with dissemination activities the more they find themselves modifying their plans to respond to broader goals (see Appendix B).

How Did Dissemination Activities Align Themselves With Your Goals?

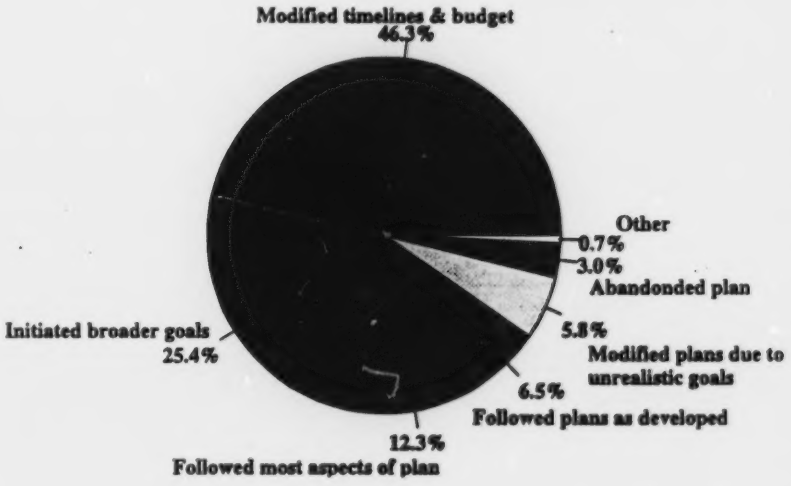


Figure 20

Determining the Utility of Support Provided by Pioneering Partners

Figure 21 rates the usefulness of the support provided by Pioneering Partners. These items are rated on a four-point scale where 1 equals not useful, 2 equals somewhat useful, 3 equals moderately useful, and 4 equals very useful. Financial support (3.72) and material resources (3.62) are considered most useful. Media relations (3.14) and grant writing (3.08) are considered least useful. Initial support is perceived as slightly more useful than ongoing support where partners are finding telecommunications support (3.33) and the receipt of recognition (3.23) most useful, technical support (2.84), and media relations (2.85) are least useful. Year-to-year analysis of this question shows little variation in responses. However, summary tables in Appendix B show in a statistically significant way that rural Partners are finding all areas of Pioneering Partners' support more useful than do their suburban and, more notably, their urban counterparts.

Significance of Pioneering Partners in Dissemination Success

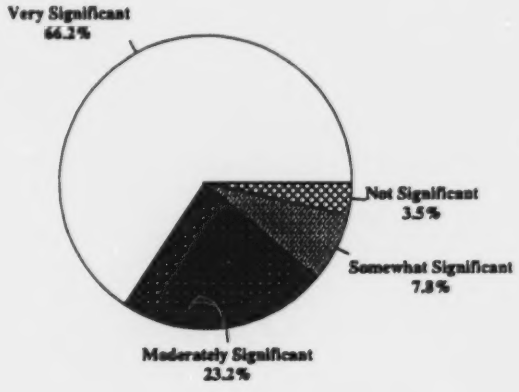


Figure 21

Figure 22 finds the respondents estimating the level of significance Pioneering Partners plays in the success of the dissemination of educational technologies. Close to 90 percent of the survey returns indicate that Pioneering Partners are either very significant or moderately significant to the success of the dissemination process. Less than 4 percent indicate that Pioneering Partners are not significant to that process. As they did in reporting the significance of the support provided by Pioneering Partners, rural respondents demonstrate at a statistically significant level that Pioneering Partners has played a greater role in their dissemination success than is indicated by both suburban and urban respondents.

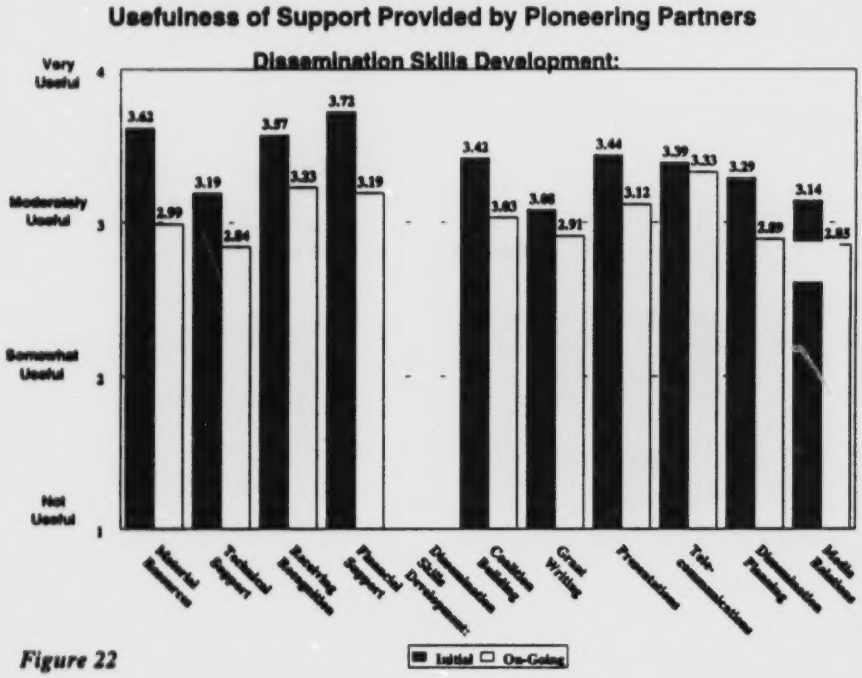


Figure 22

The forced-choice portion of the questionnaire concludes with a question asking respondents to indicate on the breadth of dissemination impact. To establish a baseline of technology application, respondents first estimate the magnitude of technology use before dissemination. They then estimate breadth of planned technology dissemination, followed by an estimation of dissemination that extends beyond the partners dissemination program. The corresponding table displays the stages of dissemination and their corresponding impact on students, teachers, coalition partners, schools, and in number of hours of technology use. The figures in each cell of the table are an average of the responses given by each of the 67 Partners represented by the survey.

The data in Table 1 on the next page illustrates that, on the average, Pioneering Partners saw participation by students almost double, and participation by teachers and schools triple during the implementation of their dissemination plans. A remarkable seven-fold increase is encountered in terms of hourly technology use per student per week illustrating that not only are more students are using educational technologies to learn, but they are using them with much more frequency. Beyond Pioneering Partner dissemination programs, data show dissemination continues to occur at especially significant rates for students, teachers, and schools.

Table 1			
Breadth of Dissemination Impact			
	Before Dissemination	After Dissemination	Beyond your Program--After Dissemination
Number of students participating	415	773 (86% increase)	1147 (176% increase)
Number of teachers participating	8.5	26.3 (209% increase)	71.6 (742% increase)
Number of coalition partners participating	12.5	6.0 (52% decrease)	8.6 (31% decrease)
Number of schools participating	2	6.2 (210% increase)	17.2 (760% increase)
Accumulative hours of technology use by students per week (hours x number of students)	430	2933 (682% increae)	740 (72% increase)

While the participation of schools, students, teachers, and the accumulative hours the technology is used per week increases, the participation of coalition partners decreases. The table shows that through implementation of the dissemination plan, the participation of coalition partners decreases roughly by half. The data presented in the table is slightly misleading, however, an analysis by location demonstrates that while urban and rural school pick up an average of one partner to add to the four coalition partner average, suburban respondents find themselves decreasing from an average of 24 partners per team, to six partners per team. This statistic demonstrates the broad support suburban school are able to draw on at the outset of dissemination process, and just how many partners serving various roles prove to be needed and/or useful during the dissemination process.

Results of Open-Ended Survey Items

To accompany the forced-choice items on the Pioneering Partners Questionnaire, several open-ended questions were also included. These questions provided the respondents with the opportunity to relate their experiences in their own words. Topics for the open-ended items included Pioneering Partners support, the Summit, impacts of/on educational technology policy, the dissemination process, and, local and regional leadership experiences. Each of the open-ended items are analyzed individually. Examination of each question includes a complete content analysis with descriptive and interpretive narration. Results are shared below.

Reasons for modifying or abandoning dissemination plans

Participants were asked to give information about how their dissemination activities aligned themselves with their goals (ie, did they follow, modify or abandon their dissemination plans). They were then asked to respond to the open ended question,"Why did you modify or abandon your plan?" Seventy-nine respondents gave some explanation for modifying or abandoning their dissemination plans. Content analysis, with entire response used as the unit of analysis, revealed nine main reasons for change in their plans.

The most common reason for modifying or abandoning dissemination plans were "time and money", with respondents indicating that they had to change their plans "to make (them) financially affordable" or because "time lines were too tight." The next most common reason for change was plan improvement, because new "opportunities evolved" or because respondents wanted to "better serve the needs of those adopting (their) plan." Several plans were broadened as participants found that, due to unexpected resources, opportunities or program outcomes, they "could expand (their) expectations", some including "Internet in every class room", or "including other districts in common thematic projects which include use of many technologies." Some projects, however, encountered unplanned for barriers. One problem noted by several respondents was a lack of administrative or leadership support. One person commented "No one at administration level has had time to come see our project, let alone supported us."

A few respondents indicated that their plans were simply unrealistic. A few others commented that they made only minor modifications, mostly due to timing difficulties, and had accomplished most of their goals to date. Some plans were modified or abandoned because partnerships were broken up through job assignment changes. Some participants, however, indicated they were able to use changes in job assignment to improve their dissemination efforts because "new opportunities presented themselves."

Although five of these categories, representing about half of the responses, offer explanations for plan modification or abandonment relating to loss or lack of resources, four categories appear to be related to plan improvement or

refinement. Overall, 56% explained that limitations in resources such as time, money or leadership had lead to dissemination plans being modified or abandoned, while 44% of the respondents explained how they had made changes, small or large, to improve their plans and/or expand dissemination.

Reasons why plans were modified	Number of Responses	Percent
Loss or lack of resources		
Time and/ or money constraints	23	(29%)
Lack of leadership or administrative support	10	(13%)
Plans were unrealistic	05	(06%)
Respondent or other partner left or changed jobs	04	(05%)
They encountered "resistance to change" or difficulty contacting other schools	02	(03%)
Plan improvement or refinement		
Improved plan to fit needs of adopting location, school calendar, or other improvement	15	(19%)
Broadened their goals	13	(16%)
Made only slight modifications	04	(05%)
Took advantage of new job/position within district	03	(04%)

Pioneering Partners role in team success

Participants were asked to rate the significance of the role of Pioneering Partners in their success and elaborate on their response. Seventy-eight respondents elaborated on Pioneering Partners' role in the success of their dissemination efforts. Content analysis, with main ideas within each response used as the unit of analysis, revealed seven main roles. Since many of the responses contained more than one "main idea" the percent of respondents who expressed each idea will not add up to 100%.

The most frequently mentioned role for the Pioneering Partners program was that of resource, contact support or information provider. Respondents indicated that "Pioneering Partners increased (their) people networking and fine tuned many skills (they) needed" and several specifically mentioned the skill development and planning elements of the program. One respondent wrote "Without the skills development through Pioneering Partners, we would not have known what and how to go about disseminating."

Many respondents also indicated that Pioneering Partners had changed the direction of their program. For example, one respondent wrote that, without Pioneering Partners "we would have taught about the same way but would not have shared any information with others." Another common theme was that the "Pioneering Partners recognition has given (them) much exposure and credibility." The prestige and/or attention that the award brought to programs, allowed them to make better contacts within and outside their districts, helped them leverage more funding for

their programs and "opened doors" for them. Pioneering Partners award money was also frequently mentioned, several respondents noted the funding was important for in-service training in technology in their district.

A few respondents noted that just being part of the program had provided inspiration and confidence to them and their colleagues and that "the enthusiasm that Pioneering Partners activities inspired in us has infected those around us." A handful of people also mentioned the Internet access as an important support in the success of their dissemination efforts.

A few participants mentioned that they had encountered problems. Some of these problems were located within their program, for example one "system reorganized educational technologies out of administration" and, according to the respondent, failed to use the award monies appropriately.

Overall the responses indicated that Pioneering Partners' role in program success was positive and appreciated. When respondents wrote about the technical and social support aspects of participation, for example, information they received, the changes in program direction Pioneering Partners inspired, and the attention their program received from the award , they tended to be very enthusiastic, using words like "very significant" and "essential" to describe Pioneering Partners role in their success. These less tangible effects would seem to be the most important impact of the program. Those who mentioned money and/or access to the Internet as Pioneering Partners' contribution to their success were positive, but not as enthusiastic in their response. Respondents who had encountered difficulties, either with Pioneering Partners support, or within their own programs tended not to mention if they had received any positive support for their program.

Pioneering Partners role in program success	Number of Responses	Percent
Technical and social support functions		
Provided information, resources and contacts	34	(44%)
Changed our program direction to dissemination	21	
Resulted in prestige, recognition, and attention	20	(26%)
Gave respondents confidence/inspiration	07	(09%)
Resource provision		
Provided money	17	(22%)
Provided Internet access	04	(05%)
Problems		
Respondents mentioned difficulties in Pioneering Partners administration or support	04	(05%)
Respondents mentioned misadministration or problems at the school/program level	03	(04%)

Pioneering Partners support

Respondents were asked to comment on what they liked and disliked about the support they had received from Pioneering Partners, and to offer suggestions for improvement. One hundred and two people responded to at least part of the question, with 96 stating what they liked, 12 stating what they didn't like and 20 making suggestions for improvement. With main ideas within each response used as the unit of analysis, content analysis of the positive comments (participant's likes) revealed six main categories. Participants suggestions for improvement, with the same unit of analysis fell into two main categories. There were only twelve negative comments made, and these were varied enough that it was not possible to categorize them further. Since many of the responses contained more than one "main idea" the percent of respondents who expressed each idea will not add up to 100%.

The accessibility and quality of support services was the most frequently listed positive comment. Remarks such as "support was excellent" and "whenever we needed help it was there, and always first class" were common. The GTE team providing support, particularly Mary Kinney and Brian Crosley, were mentioned by name in 12 of the 44 comments about support. One respondent remarked "Both Brian and Mary have been most helpful with any problems and questions."

Another characteristic that respondents found supportive was the Internet access, telecommunications and/ or "Great Links" which connected them to others within Pioneering Partners and around the state and nation. One respondent commented "The Great Links communication has been supportive. I think E-mail is the best way to keep up support and suggestions" , and another wrote "There is no price I can place on the connection to E-mail and Internet." Participants also found the training and ideas from the Summit/conferences to be a support for their efforts. One team member wrote "we really benefitted from the original training- the government industry education link was not developed then as (it is) now."

Not as common, but still fairly frequent were comments about monetary and personal support, and the support which programs gained because of "recognition". One respondent indicated "the funding gave us a wonderful cushion to attend and participate in technology seminars and conferences", another "the initial funding enabled us to implement some staff development in the first year... we have since had district support for intensive staff development." Personal support and encouragement both from Pioneering Partners and as a result of participation was also important to some respondents. One person wrote "support was a motivating factor in moving our team forward...the Pioneering Partners program spurred us further than we dreamed." Recognition of the program was also important to some. A respondent noted "the recognition helped show others that what we are doing has value."

Common suggestions for improving support included having more personal contact, reunions or follow up meetings, and having more funding available, or fewer restrictions on funding. Frequent comments included "Would like to have more meetings where the state teams are brought together" and "I would like to see more communication between the teams." Regarding funding one person wrote "I wish we could have used some grant remains to purchase hardware and software" and "I wish there was a way to apply for 'Phase II' funding." Other suggestions for improvement included follow up and/or Internet access past the funding period,

making training and support more relevant to real life/workplace issues and more training on the use of the Internet and telecommunications software.

Participants dislikes or problems included the fact that "telecommunications ignorance limited (their) ability to seek and receive help," and the telecommunications connections was hard to use. At least one person was not aware of the "opportunity for continued support" past the initial training. One participant was concerned because of errors regarding their project in the 1994 winning projects blue book and another said that "School year paperwork is overwhelming. PR is nice in local papers, but late."

In general, respondents were enthusiastic about the support they received from Pioneering Partners. Especially important to some was their personal connection with support providers, Mary and Brian. Others found the initial training and the Internet access very supportive but apparently did not take advantage of technical and program support. Even though respondents generally liked the connections which telecommunications gave them they still seemed to feel that more personal, face to face contact with others in Pioneering Partners would be desirable.

Pioneering Partners Support	Number of Responses	Percent
What participants liked about support	**96**	**(94%)**
Accessibility and quality of ongoing technical and staff support	44	(43%)
Internet/Telecommunications/ Great Links availability	25	(24%)
Initial Summit/training	24	(23%)
Monetary support	09	(09%)
Personal support, encouragement and inspiration	08	(08%)
Support because of recognition	07	(07%)
All other comments	05	(05%)
What participants disliked about support	**12**	**(12%)**
Ways to improve support	20	(20%)
Provide more personal contact, follow up Summits/reunions	15	(15%)
More funding, or fewer funding restrictions	06	(06%)
All other comments	09	(09%)

The Partnership in Educational Leadership Summit

To preface comments about the Summit, it is important to know that in the spring of the year, educator teams are selected, in the succeeding summer, educator teams attend the Summit where training and discussion in dissemination takes place. Also attending the Summit are state leadership teams composed of state government aids and officials. They are available to discuss state specific technology needs and technology policy. Leadership teams spend only a day and a half at the Summit. However, in 1992, a legislative panel stayed the duration of the Summit. After the Summit, educators implement their dissemination plans in their schools and communities. In this question, respondents were asked to comment on how what they had learned at the Summit helped them continue their dissemination efforts, and to offer suggestions for improvement. Ninety-four people responded to at least part of the question, with 82 giving examples or comments about how Summit had helped them, and 48 making suggestions for improvement. With main ideas within each response used as the unit of analysis, content analysis of how Summit had helped revealed seven main categories. Participants suggestions for improvement, with the same unit of analysis, consisted of five main categories. Since many of the responses contained more than one "main idea" the percent of respondents who expressed each idea will not add up to 100%.

The most common benefit participants gained from the Summit was increased communication and interpersonal skills/knowledge. This helped them disseminate their program, work better with business, industry, and the media and helped them to better negotiate political issues within their own districts. One participant commented "I am a more confident presenting and feel comfortable taking my message to a broader audience." Five people mentioned that communication skills and information about working with policymakers helped them when they went to seek the support of policymakers and those in government.

Time spent planning for dissemination was also an important element of the Summit for many respondents. One person noted "We developed a program and a plan to complete that program- without the Summit, our goals would not be as well-defined...the Summit focused us." Another said "my experience at the Summit...served to increase my awareness relevant to the importance of exposing our program to others."

Many respondents simply indicated that the Summit was "excellent", inspiring or confidence building. Comments such as "The Summit was outstanding" were usual. Another participant noted "The confidence-building by simply participating has helped considerably." Several participants valued the opportunity to network with other educators and sharing ideas. One person commented that "meeting others and developing a technology network was most important." Others appreciated the "the exposure to many different technologies" or technical skills such as use of the Internet and e-mail.

Several participants also found they had used the grant writing and coalition building skills the Summit helped them develop. One participant noted "We have written three proposals...and we are writing more." Another person commented "Prior to the Summit we would have done nothing with coalition building, now we have built partnerships with six businesses."

There was no one suggestion for improvement that was shared by many people. Suggestions

for improving the Summit included the following: provide follow up mini-Summits or meetings make the Summit longer to allow "more time for teams to interact informally" and to better address important issues such as planning for dissemination, provide more reality and/or skill focused information at the Summit, include Summit alumni or previous participants as mentors for new participants, and provide materials "ahead of time to help prepare for the workshops" because "there was so much to learn in a short period of time."

Overall, participants valued the Summit experience, especially the communication skills information. Most suggestions for improvement seemed to center around two issues. Participants indicated concern about the amount of material they were exposed to in the course of the Summit, and the need for some time for relaxation and informal networking. They also expressed a need for follow up contact, possibly through mentoring processes where the "'old' can mingle with and advise the 'new'" or through follow up meetings at the state level.

Summit importance and suggestions	Number of Responses	Percent
How Summit helped	**82**	**(87%)**
Improved communication skills/ ability to work with business, industry, media, political issues	29	(31%)
Helped us plan for dissemination	26	(28%)
It was an excellent, confidence-building experience	25	(27%)
Gave an opportunity to network with others	09	(10%)
Gained technical skills, exposure to technology	08	(08%)
Gained grant writing skills	06	(06%)
Learned team/coalition building	05	(05%)
All other comments	05	(05%)
Suggestions for improving Summit	**48**	**(51%)**
Have post Summit follow-up meetings	11	(12%)
Have/add more time for relaxation and/or informal networking and key topics	10	(11%)
Focus more on real school issues and specific problems	08	(08%)
Include Summit "alumni" as mentors or participants	07	(07%)
Provide pre-summit information on topics to be covered	05	(05%)
All other comments	07	(07%)

Pioneering Partners and Policy Change

Respondents were asked to indicate whether local, regional or state policy regarding the use of technology had changed as a result of their team efforts, and to describe the change. Seventy-seven people responded, with 32 commenting on local policy changes, 8 commenting on regional changes, 38 on state changes, 4 on national changes, and 8 commenting that they had seen no change. Respondents were also asked to describe how much of the change could be attributed to their involvement with Pioneering Partners, however only 8 did so.

Content analysis of comments on changes at the local level revealed seven main categories of response, when "main ideas" within each response are used as the unit of analysis. State policy changes broke down into four main categories, using the same unit of analysis. There were too few of the regional, national, and "no change" comments to further categorize them. Since many of the responses contained more than one "main idea" the percent of respondents who expressed each idea will not add up to 100%.

About half of the respondents indicated that there had been changes at the state level, either in policy, or in their ability to effect policy. The most frequent comment was that team members had improved contact with state officials. One participant commented that "our connection with our legislator made the difference" in helping them begin to work on policy change. Another commented "the governor and legislators are more aware of what some schools are doing with technology now."

Several participants mentioned that technology policies in their state were changing, and that they had helped in the process. One participant wrote:

The state of Pennsylvania has adopted a new curriculum in technology education at the Middle School level, and is about to adopt the secondary programs. We were not only involved in writing this curriculum, but also saw which of our programs (was) adopted.

Another said "as a result of our efforts, state policies are currently being developed that will ultimately...(allow) every child in Michigan to be exposed to the technology."

Programs and team members are also helping support funding changes and policies affecting access to technology services. One participant notes "our state budget has allowed funding for all schools to be internally wired and will also support hardware in the classroom." A few team members noted that they were trying to effect policy change, but hadn't seen it happen yet.

Just less than half of respondents said they had succeeded in effecting, or were working to effect some local changes in policy. Some had been involved in creating district policies or practices to improve teacher and student access to technology. For example one respondent wrote "sites have now been made accessible in my county...Finally the city office has started to allow teachers access." Others mentioned that their districts had implemented technology plans or begun technology committees since their involvement with Pioneering Partners began. One person noted "Great changes are occurring. The entire district is now working on a new 5 year technology plan to update all labs and add 5 new computers to each classroom." Other local changes include improved funding for technology, technology being integrated with curriculum elements, the involvement of chamber of commerce groups and/or businesses in partnerships, and school participation in "model" or "pilot school" programs.

Regional and national work on policy included helping other school districts with their technology plans, program dissemination and presentations at national conferences. A few respondents commented on the lack of change in their local or state policies. One person commented "The lack of interest by New York officials has been distressing and discouraging." Others attributed lack of policy change to the newness of their efforts. One respondent wrote "I truly believe (policy) will change once our dissemination process gets in full gear."

Although respondents were asked to note how much of the policy change they had seen was attributable to their participation in Pioneering Partners, however only a few actually mentioned this directly. Pioneering Partners seemed to affect the program's ability to gain access to policymakers, for example the governor, or to increase awareness of technology in local and regional schools. Only one person actually gave a quantified response, stating "Pioneering Partners role is probably 50% in affecting change." At least 27 respondents who had noted policy change, while not mentioning their participation in Pioneering Partners directly, stated that they had played some role in supporting the changes or helping bring them about.

Program work on policy change	**Number of Responses**	**Percent**
Local	**32**	**(42%)**
Policies affecting access to technology for students/teachers	09	(12%)
Establishment of technology plans/planning committees	08	(10%)
General comment that local policy had changed	06	(08%)
District funding policies/priorities/grant writing changed	05	(06%)
Technology integrated into aspects of curriculum	04	(05%)
Business or chamber of commerce partnerships	04	(05%)
Model or Pilot School status	03	(04%)
Regional-- all responses	**08**	**(10%)**
State	**38**	**(49%)**
Improved contact/participation with policymakers	19	(25%)
State has or is planning funding/services for technology	10	(13%)
State has or is planning policies/curriculum changes	08	(10%)
Respondents working to effect change/ not yet successful	03	(04%)
National-- all responses	**02**	**(03%)**
No change comments-- all responses	**08**	**(10%)**

Relationships with policymakers

Respondents were asked to indicate whether Pioneering Partners helped their school develop institutional relationships or resources with policymakers and to describe how it had done so. A total of 97 people responded to the question, however, 34 of those responded "no", of the 63 who had established some relationships with policymakers 16 mentioned local relationships, 35 state relationships, 7 national relationships, 10 business related relationships, and 7 said "yes" with insufficient information to categorize the type of relationship. Of the 63 positive responses 16 people gave information indicating whether their relationship was on an institutional or personal level. Twenty-six more indicated "we" had established relationships, but did not specify if they meant their team, a group of teachers, the school or the district. Content analysis of the ways in which Pioneering Partners helped teachers, teams and schools establish relationships with policymakers revealed three main categories when "main ideas" were used as the unit of analysis.

Reasons for "no" relationships with policymakers included lack of interest on the part of the team school or district, lack of time or resources to establish these relationships or just the fact that "policymakers are out of the loop." Those who had established relationships with policymakers, as a group, had relationships with them at every level from local school administration to the federal government.

Local relationships with policymakers included, local legislators, mayors, and members of the school board as well as the local "community". One respondent noted that as a Pioneering Partner award recipient "we have had the full support of our administration for the implementation of our program."

State relationships, which were the most common links, included legislators, superintendents, and governors, as well as state representatives. Comments such as "There is an open door in the Governor's office" were frequent. Some productive relationships were a direct result of Summit contacts. For example one person noted:

> *We are very much in contact with assemblyman Paul Tanko, who was a liaison at the Summit. His acute political insights have proven (useful) to us, while we are attempting to secure other resources.*

A few respondents noted national level relationships particularly through "national seminars" and one respondent had "been to Washington D.C. and met with...state law makers and president Clinton, as part of the presidential awards." Several respondents also noted relationships with business and industry, stating "business have provided equipment (and) expertise." One respondent wrote we have "more relationships with the community and businesses involved with telecommunications. They have helped us become more advanced." Several respondents noted that they had been given "direct access" to policymakers, but did not specify who.

Although the question asked about institutional relationships many respondents commented on personal relationships instead. For example one respondent wrote

> *I called the governor's office this morning about Tech 2000. Marilyn McConachie had called me trying to seek other schools to join the Peoria team's energy audit. I have visited state senator Frank Watson and will visit him (again) next week to urge release of funds for telecommunications for ALL schools in the state.*

Those who did have state level relationships, frequently did so through school visits or programs for policymakers. For example "During the debate .... regarding the Information Super Highway bill, we invited the governor and the legislators to our school to see the Internet." For the most part, respondents did not give enough information to judge whether the relationships they wrote about were institutional or personal, for example one respondent wrote:

We have always had a good working relationship with our Dept. of Ed. However, since our involvement with Pioneering Partners they have provided an opportunity for us to meet different policymakers and talk to them about the importance of technology.

The vast majority of respondents who said that Pioneering Partners had helped them establish relationships with policymakers mentioned establishing personal contact with policymakers as a benefit. One respondent wrote " I have met many people both in government and private industry because of the Pioneering Partners program." A few also noted they had become more deeply involved in the policy process, serving on committees or in advisory roles.

We have become directly involved with individuals at the DOE...three team members were on a state technology committee this year...one member was on the state planning commission for new teachers and mentors workshop given in February... (this) became the center of a committee governing a technology grant from the DOE for 94-95.

Relationships with policymakers	Number of Responses	Percent
Level		
Local	16	(16%)
State	35	(35%)
National	07	(07%)
Business and Industry	10	(10%)
Relationship, but unable to determine level	07	(07%)
No relationships with policymakers	34	(34%)
Type of relationship		
Personal/professional communication	10	(10%)
School or district	06	(06%)
Relationship between policymakers and us (possibly team)	26	(26%)
Unable to categorize	21	(21%)
Strategy for establishing relationships		
Built personal contacts	33	(33%)
Service on committee/advisory roles	05	(05%)
Other, including pilot school status	13	(13%)

Results of dissemination on student learning

A total of 94 people commented on the impact of their dissemination efforts on student learning. Eighty three of those responding commented on the effect of their efforts on student's experiences, while forty-four commented on their effects on teachers' experiences. Content analysis of comments on the dissemination efforts' effects on student learning revealed five main categories of response, when "main ideas" within each response are used as the unit of analysis. Effects on teachers experiences fell into three main categories, using the same unit of analysis. Since many of the responses contained more than one "main idea" the percent of respondents who expressed each idea will not add up to 100%.

The most commonly reported effect dissemination activities on the student experience was increased exposure to and use of technology. Comments such as "students have better access to technology" were frequent. One respondent wrote

> *Prior to our dissemination projects to neighboring schools, their students were also in the "Dark Ages" regarding computers. By sharing our experience with them, they too were able to expand their use of the latest technology.*

Another team member reported that their program effected students access to technology beyond the school day, and would hopefully reach beyond the school population eventually.

> *Our Chapter I lap top lending program has now been expanded to include a K-8 students in the school district who wish to borrow a lap top computer to take home. In the future we foresee this program expanding to the high school level and eventually to anyone living in the school district.*

The Pioneering Partners work has also helped exposure to technology in non-technology courses. One teacher's dissemination efforts in one program caused her to "look at all elements of (her) curriculum, ...putting technology in even more..courses." Along with improved access and exposure to technology in new settings comes improved use of technology. A few teachers wrote comments such as "Disseminating our activities has increased the ways students are using the technology. They have moved beyond word processing to multi-media and telecommunications."

Many teachers also commented on changes in student learning behavior, particularly changes toward self motivated, active learning. Teachers noted that students were "more involved...willing to try...so experimenting" and that "by trying these things they are really expanding their knowledge." Comments such as "students are actively engaged in their own learning and motivated to learn" were frequent. Changes in student learning because of technology program dissemination included an increase in student "excitement" about learning. One teacher noted "Students have become more willing to explore mew resources and are excited about learning new methods for gaining information and building on it." With students in "active learning" made the locus of control for their learning processes also changed. Comments such as "students become more self directed and goal oriented" and "students have taken more responsibility for their learning" were frequent. Dissemination efforts have helped make students excited, enthusiastic, eager, self motivated learners, who "employ more senses" and "love learning."

Teachers reported changes in many different student characteristics. Several teachers, particularly those working in programs where student assistance was used in demonstrating or implementing the program noted that "students have taken tremendous pride and ownership in this course." The students seemed to gain a sense of themselves as "experts" who could provide assistance to others, not just vessels to be filled with knowledge. Several teachers also noted better student outcomes, both in learning course materials and in life skills. One teacher wrote "students turned their knowledge into better jobs, scholarships, and an increased awareness of the business world." Another teacher noted "students are better prepared for the world of work." The Pioneering Partners program also helped students to "move beyond the classroom" and "experience a global connection" not just with information but with people. Both through experiences at conferences (for a few students), and experiences through telecommunications (for many), students have been able to share their knowledge and experiences with others and gain new knowledge in return. One teacher wrote "The original project was a travel journal. Now, through the Internet, our students have been able to share with people from their chosen country. These have been unique experiences..."

In general, comment about impacts on teacher experiences mirrored those about student experiences. The most common observation was that " "Teachers...are learning new ways to teach." Many respondents made remarks such as the "teacher's role has changed from information provider to facilitator, co-explorer and co-learner", and "teachers become better ...facilitators, not managers or directors." One teacher wrote

> *I have become more aware of the learning styles of my students and have become much more of a facilitator than a teacher standing in the front of my classroom asking my students to memorize and retell me facts and figures.*

It is apparent from these comments that the shift in roles from teacher as "director" to teacher as "facilitator", parallel the shift in students from passive receptacle for knowledge to active seeker of knowledge. Respondents also noticed other changes in teaching skills, including the ability to "integrate technology into daily programs." According to one person "Teachers are using our ideas to enhance their own classes." One teacher listed,

> *Results of our dissemination in the class room include: restructured teacher/student roles, alternative assessment strategies, technology integrated curricula, active learning, (and that) teachers develop new excitement for change.*

Dissemination efforts also helped teachers become more aware of, and less afraid of technology, and allowed them to use it more, and more effectively in their classes. "Teachers are becoming much more comfortable with technological innovations and support systems." Reduced fear of technology has lead to more teachers using technology. One respondent commented that "faculty acceptance and use within the school have both been greatly increased" and another that "teachers are clamoring for more technology." The exposure to, awareness of and excitement about technology have been accompanied by increased long term technology access. Respondents noted that "We now offer ...video production courses...we have added four computer labs and installed four computers in each 3-6 grade class room" and that "since 1992 83% of faculty have purchased their own PC's and 27% have their own Internet access."

Although the vast majority of respondents reported positive effects from their efforts, a few were met with negative reactions from colleagues. One team member noted "some teachers are intimidated and overwhelmed." Another noted "Our math department (chairperson) was strained - traditional teachers only "hardened" his resistance to computers and change. He and others actively worked against our program." These cases were only a very few, however, in the midst of many positive comments. A few respondents noted that teachers, like students, had broadened their lines of communication with the world, and their access to many sources of information, and that teachers, too, were taking pride in the new accomplishments taking place in their schools.

skills required when learning technology have lead to changes in the way students and teachers interact in the class room. Teachers are less directive and more facilitative and students are more active and excited.

Pioneering Partners effects on technology leadership

Teachers were asked to indicate if their involvement in Pioneering Partners had moved them into regional and statewide leadership roles in using and disseminating technology and to describe those roles. They were then asked to indicate how their relationship with Pioneering Partners had helped them in this leadership role. A total of 105 people responded to the question in some manner.

Impact on student learning	Number of Responses	Percent
Student experiences		
Increase access to, use of, technology	34	(36%)
Change to active learning, become enthusiastic	28	(30%)
Gain pride/self respect/self-esteem	11	(12%)
Experience better outcomes/gain life skills	09	(10%)
Increase contact with "the world"	08	(08%)
All other comments	06	(06%)
Teacher experiences		
Gain new teaching skills/become better facilitators	21	(22%)
Increase knowledge of, access to, and use of technology	19	(20%)
Resistance	03	(03%)
All other comments	06	(06%)

In terms of impact on student learning, dissemination of technology has been both a change and a catalyst for change. Student knowledge of, and access to technology has changed. Students and teachers use computer, video and other technologies for more and different activities. In addition, the different

Twenty-two of the 105 indicated Pioneering Partners had not moved them into leadership roles in technology. Of those remaining 31 indicated they were involved in technology leadership at a regional level, 56 at a state level, 18 at a multi-state, national, or international level and two said "yes" but did not

specify. Sixty-six respondents answered the portion of the question regarding Pioneering Partners help with their leadership role. When "main ideas" within each question are used as the unit of analysis, answers fell into seven main categories. Since many of the responses contained more than one "main idea" the percent of respondents who expressed each idea will not add up to 100%.

Thirty-one of those who indicated they had leadership roles in technology had them at a local or regional level. The most common type of leadership role at this level was as an advisor or advisory board member, for example on "a district level technology planning committee." Others indicated that their "regional involvement is heavy" in building coalitions with "schools, businesses and colleges." Others helped form, or served in local or regional associations, and presented at regional conferences for technology and a few had been asked to conduct regional workshops.

Most respondents indicated leadership roles at a state level, the vast majority through participation in state seminars, workshops and conferences. Comments such as "I have been invited to speak at numerous conferences" were common, although only a few people actually named the conferences. A substantial number had also served on advisory panels to, or been interviewed by state government officials. One respondent wrote that she had "been involved with (the) state computer organization and helped organize a technical showcase for the governor." A few others were also involved with state organizations, and helped promote technology within their fields. For example, several teachers worked with the Wisconsin State Music Association on the technology committee and another teacher was active in the Indiana Foreign Language Teachers Association. A few respondents also consulted in technology areas.

Several respondents were active at a multi-state, national or international level. Most, again, through conferences or workshops, some as trainers, a few through the Internet (one as a forum moderator), and a few through publications. One wrote "I am presently giving or have given work shops on our mini-golf project, and telecommunications in New York, Miami, Santa Barbara, California, all over Illinois, and Indianapolis." Another reported having been asked to publish in periodicals.

Of the 83 respondents who said that they were in leadership in technology 66 discussed Pioneering Partners role in their work. The most frequent comment among these responses was that the honor, recognition or credibility that the Pioneering Partners award gave them had assisted them in their leadership capacity. Respondents frequently made comments such as "the fact that we were honored ...as an awardee has permitted us to influence others." One respondent noted "Pioneering Partners is a spring board. The recognition causes introduction to leadership positions." Also frequent were comments that the sense of inspiration and unification that being a Pioneering Partner gave them helped in their leadership roles. Several respondents reported that "Pioneering Partners has been inspiring and supportive." One wrote that they "could not do it without Pioneering Partners because we would not think...that what we do is worth the trouble of sharing."

Also present, though not as frequent, were comments about ways in which the money and Internet access, and Pioneering Partners training and information had helped. One participant wrote "The status, and the grant to pay for travel and conferencing is helpful." Several people simply noted that "the money" or "the Internet account" had helped. Comments about training, information and technical support were more enthusiastic. One

respondent wrote "Pioneering Partners helped prepare us for the politics involved in education and the importance of public relations." Another wrote "They helped by showing we could talk to government leaders." Ongoing assistance was also noted. One person indicated that "they (Pioneering Partners) provide me with any help or items I need" in making presentations on the project.

Several found the contacts they had made through Pioneering Partners valuable in their leadership roles. A few mentioned the initial introduction to key stakeholders and policymakers the program had given them, saying "Pioneering Partners initiated several of the contacts" that had helped them into leadership roles. One person wrote Pioneering Partners "is helping me to make new contacts with peers throughout the state." Program public relations and speaking opportunities that gave "visibility" to programs were also of importance to some. One respondent commented "the PR received has been most valuable." The award gave some a forum to speak, one person wrote "Until we were a Pioneering Partner we were not invited to this advisory role with the governor." Only a few participants who wrote about their leadership roles noted that the Pioneering Partners award had not really helped them.

Leadership roles in technology	**Number of Responses**	**Percent (out of 105)**
Regional/local	**31**	**(29%)**
Service/presentations to associations or workshops	12	(11%)
Service on advisory teams/planning	09	(08%)
Did not specify or other responses	12	(11%)
State	**56**	**(54%)**
Conference presentations/workshops	33	(31%)
Advisory roles/teams	17	(16%)
Offices/roles in organizations (ie, Principal's or Foreign Language associations)	10	(09%)
All other, including consulting and did not specify	09	(08%)
Multi-state, National and International	**18**	**(17%)**
Conference presentations	12	(11%)
America On Line or Internet roles	03	(02%)
All other responses, including publications	05	(04%)
Not involved in leadership roles	**22**	**(21%)**

How Pioneering Partners has helped	**Number of Responses**	**Percent (out of 66)**
Helps	**62**	**(94%)**
Provides recognition or credibility, is an honor	22	(33%)
Provides inspiration, sense of self worth	12	(18%)
Provides money, Internet access or resources	10	(15%)
Provides training and ongoing support	10	(15%)
Is a source of contact with peers/key people	07	(11%)
Helps with PR or speaking engagements	07	(11%)
All other responses including unspecified yes's	03	(05%)
Has not helped	**04**	**(06%)**

Types of financial support reported for augmenting dissemination

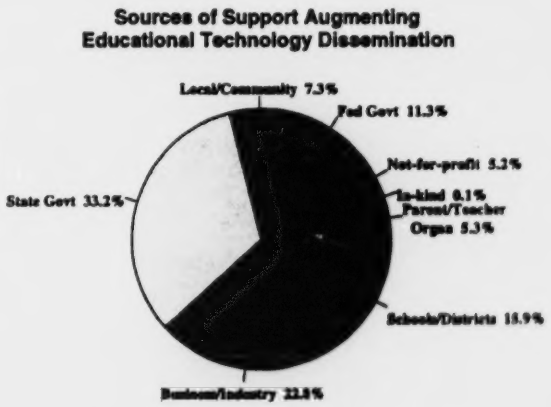
Respondents to this question reported total financial support in dollar volume of $1,575,750. Financial support broken down by state includes:

Ohio	$442,400
Illinois	$415,000
Minnesota	$365,000
Wisconsin	$201,000
Indiana	$62,000
New York	$62,000
Michigan	$27,650
Pennsylvania	Not Reported

Sources accounting for the dollar volume include: state governments and departments of education; business and industry; local schools/districts; federal government; community support reserves; parent and teacher organizations; not for profit organizations; and in-kind contributions. The pie graph to the right illustrates the distribution of available funds to these sources.

In broad terms, data show that large portions of Wisconsin and Minnesota support for dissemination comes from local schools districts. The largest portion of Indiana and Illinois support for technology dissemination comes from business and industry contributions. Minnesota also gathers large support from the private sector. State funds allocated for technology use in the schools are a major portion of most states support, but, seems to be most prominent in Ohio and New York.

Several caveats related to the information presented in response to this question qualify its findings and make further analysis difficult. The first is that only 56% of the totals survey respondents answered this question. Second, while the data reduction process took as many steps as possible to assure accurate and unduplicated calculation, we cannot assure absolute validity of information because some respondents did not identify sources to accompany dollar amounts. Also, it is possible that many respondents have confounded financial support augmenting dissemination efforts with larger technology grants of which only a small fraction goes to dissemination. Finally, while respondents did mention a number of well known technology initiatives within the great lakes region, several were left unmentioned,



such as Ohio's Schoolnet Plan, and Michigan's Excess Earnings Rate Case. With these thoughts in mind, these figures should be looked upon as a very conservative estimate of expenditures of resources toward educational technology in these states, and an overestimation of the amount dedicated to dissemination.

Case Study Methods

The intent for the use of the case study as a data collection method lies in its ability to examine complex issues and relationships within the context the study's exist. Rationale for case study methodology can be found in the writings of Bogdan and Biklen (1982), Miles and Huberman (1984), Williams (1986), and Patton (1990). While presenting slightly varying approaches to case study methods, these authors agree that interpretive accounts facilitated through observation, interview, and document analysis comprise the case study, which are the approaches these case studies have employed.

Issues

The task for the case studies was describing the experience of dissemination at the four case study sites. Issues guiding case study inquiry were identified in the evaluation design, and included:

- Dissemination mechanisms moving educational technologies from single to multiple contexts
- The presence of learning goals and strategies to which the technology is applied.
- Progress in teacher professional development to support technology use in more functional, engaging, and useful ways.
- The extent of administrative support for dissemination and perspectives of teachers within the schools who are not involved in the use of technology or its applications.
- The impact of dissemination on teachers, students, schools, and communities.
- The role of Pioneering Partners in facilitating the dissemination process and utility of the technical assistance they provide.

Selection of Sites

Attempting to represent the experience of 72 Pioneering Partners sites selected over the last three years by studying four sites does indeed stretch generalizability efforts. However, four sites, if selected appropriately, would still provide a good view of dissemination experiences. Consulted by the managing directors of the Pioneering Partners program, the evaluation team selected an urban, rural, suburban, and one small city site to study. All but one of the sites were funded in 1992. The fourth was funded in 1993, providing the study with sites of relatively long-lived experiences in educational technology dissemination through Pioneering Partners. These sites also experienced a very diverse range of dissemination success and effects.

Data Gathering Methods

Each case study site was the subject of a two day visit by one member of the evaluation team. A standardized observation/interview protocol was used by the evaluation team drawn largely from the evaluation design. Team members used the protocol instrument as far as it proved useful and in no way compromised the uniqueness and individuality of the site. Case study evaluators attempted to

satisfy reliability and validity requirements by obtaining multiple perspectives on issues of inquiry, such as from teachers, administrators, students, school board members, community business partners, curriculum developers/ specialists, etc. Researchers also were careful to, where it was possible, address each issue using multiple methods, such as observation, interview, and document analysis. Follow-up interviews via telephone were conducted after the initial site visits to provide clarity and to fill-in gaps in data collection.

Using descriptive and reflective material, researchers crafted case study summaries designed to address the evaluation questions and present other relevant findings. In an effort to obtain as candid responses as possible, pseudonyms are used in case study description, although a great amount of detective work is not necessary to determine case study sites and informants. From the four case studies, a cross case study provides a brief look at the dissemination of educational technologies among Pioneering Partners.

Case Study: Eden Park Pioneering Partners

The story of the Pioneering Partner's dissemination project at Eden Park Community High School (EPCHS) is complex and involves transformation of ideas, multiple phases, and a broad range of partners. The process began when Jack Browning, science teacher at EPCHS, attended a teacher-team seminar for Weatherization Audit Training for Teachers and Students (WATTS). It eventually led to the creation of ENERGYNET, a technology-based project that linked the WATTS concept across schools using telecommunications. Because ENERGYNET was funded for dissemination by GTE Pioneering Partners, the cumulative body of work that began at EPCHS has informed dissemination and the role of environmental education throughout the state of Illinois.

Project Goals

The goals of ENERGYNET, and its predecessor WATTS, were to increase scientific literacy and create real-world technology applications for students. ENERGYNET's focus on energy, in effect, not only satisfies these project goals, but reaches beyond the school doors to potentially impact community economic development and environmental conservation. One ENERGYNET teacher leader comments on this focus:

> *One goal was to give all four school districts—the school communities—a common focus . . . something with a real academic nature that everybody could work on together to see real improvement in the community as well as within the school.*

The classroom teachers who launched the project underscore the way curriculum and "standard operating procedures" in the classroom are altered through ENERGYNET:

> *In the past the computer applications teacher was asked to teach spreadsheets and things of that nature all out of the book; it's all kind of hokey, really. So the computer applications teachers are looking for real-life experiences to teach students. That's what we've developed here and now [are developing at] other locations across the state.*

The Chronology of the Project

The problem of energy conservation provides the substance for technology applications in ENERGYNET which has its basis in the WATTS project.

Overview of WATTS

WATTS was developed and implemented by the Illinois Department of Energy and Natural Resources'(ENR) Illinois Energy Education Development (ILEED) Program. ENR is a nonregulatory body that provides data, information, and objective analysis of Illinois's natural resources, and the environmental and socioeconomic effects of their development.

WATTS is one of several school-based programs offered by ILEED. It focuses largely on identifying inefficient lighting and heating practices. The program has three phases: (1) identify and track the school's energy use, (2) develop ways to reduce that energy use, and (3) apply for federal funding to implement energy reduction strategies.

The WATTS program introduces high school students and teachers to energy auditing and energy-efficient building maintenance. In order to complete the audit, students must integrate mathematics, science, reading, computer applications, and writing skills. Specifically, they must read blueprints, create

architectural sketches, measure windows and light fixtures, examine energy bills for all forms of energy (natural gas, fuel oil, coal, LP gas, steam, and electricity), use spreadsheets and analyze use of energy relative to costs, identify specific types of building materials, and calculate BTUs in order to summarize the energy consumption and cost history for all forms of energy. Finally, they need to analyze all the data to make energy conservation recommendations. However, instruction is hardly the only goal of this educational program. As suggested by the WATTS logo, the program is also designed to empower teachers and students to develop leadership and affect policy.

Implementation of WATTS at EPCHS

Getting Started. Browning was already part of an Illinois network aimed at improving instruction by involving students in authentic environmental tasks. He was invited to attend the student/teacher weeklong seminar offered by ILEED in 1992 at the University of Illinois in Champaign. Also attending were professionals from a coalition of partners including the University's Energy Resource Center (ERC) and the Illinois Energy Education Development team from the Illinois Department of Energy and Natural Resources.

Completing the Energy Audit Workbook. Browning took the concept of WATTS back to his school. The program seemed a natural outcome of the school's commitment to environmental issues and technology. They could use their technology to analyze, organize, summarize and facilitate the dissemination of the WATTS program. Browning recruited John Kelly, the computer teacher. Others came on board including a math teacher and an industrial technology teacher.

Applying for the Technical Audit. When applying for the Technical Audit, the newly formed team made a number of decisions that considerably expanded the scope of the program. First, they added three sections of Business English classes to assist in writing letters to the national and state policymakers including the President. Second, the team applied for $60,000 in technical assistance funds from the Institutional Conservation Program, a federally funded grant program which provides funds for technical assistance and energy improvements in schools and hospitals. Third, they decided to involve four school districts and 12 contiguous schools (including EPCHS). At the same time, March 8, 1993, EPCHS applied to Pioneering Partners.

Each school completed its own Energy Audit Workbook (phase one application). Between summer 1992 and winter 1993 students measured and performed calculations, teachers wrote grant applications, and superintendents signed off.

Applying for the Energy Conservation Grant. By spring of 1993, EPCHS and three additional school districts received notice that had been granted funding on an 80 percent-20 percent basis. Specifically, the schools received $47,000 from the U.S. Department of Energy to help hire a professional engineering firm to perform the technical audits on the school buildings. EPCHS hired consultants from the ERC at the University of Illinois at Chicago who were to train four students to do the audit as audit interns. The students would receive training in using Alice software developed and supported by ERC to synthesize data from multiple sources, training in using the Internet, and training for the audit.

Impact of the WATTS Program

The impacts WATTS had on EPCHS were broad-based; they ranged from instructional to fiscal, and included creating new roles for teachers and new networking avenues.

Instructional. Project staff described student impacts that ranged from direct and very personal effects for a small group of students trained as audit interns, to general benefits for all students because of the degree of individualization possible with the hands-on energy focus.

Two teams of four students took the lead in conducting the technical audits at the 12 area schools. These interns overcame a problem in the main spreadsheet provided to them by creating one of their own. The interns who began by shadowing engineers gradually took on increasing responsibility. In fact, as the students worked with the building engineers, they built up so much trust that the engineers provided them with keys to the buildings. As the students conducted the audits they learned to use to use Excel and databases and to read blueprints and drafting plans, as well as a range of subject area and social skills. One student described skills he learned that he feels have definitely transferred to novel learning situations: the necessity of being accurate and pattern recognition. He says that whenever he is in an unfamiliar building, his first impressions are automatically related to how the building uses energy. This student has changed careers plans from advertising to engineering as a result of his experiences with the program.

In general, teacher implementors at EPCHS feel that the energy focus allowed for flexible and individualized impacts for diverse students. They recalled how an accelerated student was challenged by the topic and devoted herself to an investigation of smokestack particle emission and kilowatt usage. They contrasted this application with how the program affected students with learning difficulties. For example, teachers said that students with special needs would go home and get their parents involved in the task of finding out how much energy units the refrigerator uses. The teachers interviewed felt that practical investigation of energy questions could be individualized to students' needs and strengths and could be challenging to even the most gifted of students.

Another general indicator of impact cited by teachers was increased student participation in a local energy program to conduct home energy audits.

Fiscal. There were fiscal benefits to EPCHS based on the number of schools they signed on to the audit process. These came in the form of grants from ENR as well as savings in schools and other buildings (e.g., library, bus barn). EPCHS also received accolades for having the most complete program of all the original 1992 WATTS schools. Because of its audits and recommendations, EPCHS had significantly affected school finance in the participating schools.

New roles for teachers. While Jack Browning and John Kelly, the teachers who launched the program at EPCHS, had been committed to environmental issues, they, as well as others at EPCHS have become change agents—entrepreneurs. These teachers received in-kind contributions from nine business partners including international companies, such as IBM and McDonald's, as well as local energy agencies such as Pekin Energy Company; six government agencies such as park districts and various environmental agencies; and four universities. Browning's role has also expanded. He has submitted articles about WATTS to various journals including Spectrum and Electronic Learning.

How WATTS was transformed into ENERGYNET

WATTS was an enterprise for EPCHS that allowed for real applications of technology while conserving energy. In 1994, TECH 2000 Coalition was awarded a grant to fund

ENERGYNET, the statewide telecommunications and energy auditing project. ENERGYNET then took the WATTS concept further using Internet connections to link 17 schools which were attempting the energy audit. Teams within these 17 schools were to do an analysis of their schools' energy consumption and then communicate that information to various organizations including the ERC at the University of Illinois. As part of ENERGYNET, participating schools became part of a vital network of organizations and individuals actively seeking to change the role of students and schools related to technology application and energy conservation. This network is primarily made up of noneducators who bring the work of the ENERGYNET schools to the attention of policymakers. One showcasing activity was an Energy Convention where students presented their work and policy ideas and plans to Illinois legislators.

Challenges and lessons learned in implementing ENERGYNET.

Not all school approached the energy audit in the same way during their start-up year. EPCHS, in it third year of energy auditing, was successful in implementing the energy audit as an interdisciplinary curricular effort among the math, science, and computer teachers involved. About half of the ENERGYNET schools integrated energy auditing into regular courses, Some other schools placed the project in extracurricular activities during the first semester, partly in order to get more familiar with the curriculum and new roles for students, and moved it into their second semester. The remaining schools implemented the program unevenly in extracurricular activities. The schools plan to integrate the audits more fully during the 1995-96 school year. Even though EPCHS program implementors consider the energy audit a success, they admit that their attempts to establish real-world technology applications as an integral part of their curriculum are still a work in progress.

> *We have not ended up reinventing the original idea. We're using it as a core for other ideas.*

All 17 of the schools that signed on to ENERGYNET were not as successful in their efforts as EPCHS. Energy audits were completed and entered into the Alice database by several schools, and lighting recommendations were generated and proposed to school board by many other schools. John Kelly provided technical assistance to schools through on-line moderation of the process. Even with this assistance, there were a number of obstacles that prevented implementation among the new schools: (a) teachers did not have the hardware that was promised to them when the project began, (b) there were network access problems, (c) the software application was changed mid-year, and (d) teachers unfamiliar with technology were starting from ground zero.

ENERGYNET's first activities moved more slowly than expected, with many successes, plus a number of missed deadlines and failed attempts. In the majority of cases, the audit process was not internalized as part of the curriculum; rather it was implemented unevenly as an extracurricular activity. The EPCHS project team is only aware of two or three schools that completed the process. In fact, aside from their own school, the EPCHS project team cited a single success story. They report that one high school adopted the energy audit process, made it part of the curriculum, and came up with their own lighting recommendations for the school.

The project team does not blame irresponsibility for the missed deadlines and failed attempts; it is common to encounter barriers

and obstacles when beginning a new project. The project team believes that the obstacles cited above prevented most of the schools from completing the audit. According to John:

> *There was too much asked of people. It [the ENERGYNET project] can't be an add on. Lack of knowledge, skill, and time prevented schools from following through.*

According to the EPCHS project team, in order for the audit process and its technological applications to be infused into the regular curriculum, two things are required: (1) time and proper training and (2) leadership within the school. Proper training includes training in technology, learning the actual content of the energy audit, and training in telecommunications, which encompasses the actual software. The ENERGYNET team believes that training and support are also needed for school leaders, including principals; they have also identified a need for support focused on the changing role of students and teachers. The EPCHS underscored the importance of involving volunteers only in this kind of project—people who are really interested in the process and making it part of the curriculum.

The project team described one unintended negative outcome of not having time for proper training: the potential for "turning some teachers off regarding technology."

Support and Impact of the GTE Pioneering Partners

Participation in GTE's Pioneering Partners completely changed the life of the WATTS program in EPCHS because it:

- Connected EPCHS with a vital network of noneducator mentors, lobbyists, and change agents interested in effecting technology and energy policy in the state.
- Resulted in contacts that allowed EPCHS to become central part of TECH 2000's ENERGYNET project.

It is clear that EPCHS had already travelled a good distance educationally and fiscally before they were awarded the Pioneering Partners dissemination grant. However, Pioneering Partners provided EPCHS with the resources for disseminating the project. Primarily this included training in dissemination and the tools to develop a dissemination plan.

Receiving recognition and enhancing dissemination. As a result of their participation with Pioneering Partners, members of the project team presented at numerous conferences including ASCD, ISTA, AAAS, and TECH 2000. WATTS and ENERGYNET were recognized with numerous awards including the Take Pride in America Award for first place in environmental education in Illinois, the Illinois Energy Educational Development Award (ILEED), and the Connections 2000 award. In addition, EPCHS has established both a printed newsletter and an electronic bulletin board system to disseminate the program.

GTE Support. The EPCHS project team described the support provided by GTE as "phenomenal." The project team felt that the Summit gave them the "skills they needed for where they were at in the process." However, they did offer some areas for improvement. These included the need for more training, particularly longer sessions—and more sustained training in one area. Time was also an aspect of implementation and adoption where the project team thought that GTE support could be pivotal. One suggestion was that GTE funds be used to pay substitutes to provide teachers with an hour during the day to work on infusing technology into their classroom curriculum [since the inception of

the program, Pioneering Partners funds are approved for payment to substitutes when teachers are involved in dissemination planning or presentation activities].

GTE provided funding for presenting their innovation, accessing Internet for networking with other schools, and maintaining the visibility that brought them to the state house. Aside from these more tangible supports, the project team felt involvement with Pioneering Partners in general, and the Summit specifically, provided them with confidence in their work. According to one project team member, "One of the big things that they did for me is show me that I really had something to offer."

At a more diffuse, macro level, Pioneering Partners has been the catalyst for EPCHS to become part of a statewide network that is:

- Changing how schools and students affect policy and practice in substantive areas.
- Changing policymakers' expectations for how technology can be used in schools.
- Illustrating to the public a new role for students and schools as change agents in areas of community economic development that extend well beyond the school doors.

Exiting Interstate 84 heading south onto Shilling Avenue, I find myself in the center of a city showing the obvious signs of urban degeneration. Only a few inches of lawn or gravel separate the two-story row houses, many of which are dotted with plywood patching to cover broken windows or decaying siding. The narrow streets are lined with older model cars that flaunt their rust like proud battle scars. As I venture a few more blocks into the neighborhood I'm struck by the presence of a fairly new structure on my right. It appears at first to be a multi-leveled professional building. However, since few professional buildings have playgrounds attached to them, I conclude that I have arrived at Delmar Elementary School.

As I pull into the rear parking lot I notice that it lies uncomfortably close to railroad tracks that run in and out of the city. The deafening blast of a passing locomotive's whistle tells me that it's a frequently accessed route. I think for a moment that perhaps more than once a day the train carries away not only freight, but an occasional child's imagination.

Walking towards the school I marvel at its structure. The sharply vaulted roofing blends nicely with the steeply pitched roofs of the surrounding homes. The bay windows protruding from the walls on the brown brick edifice make the building seem as if it were about to burst from all the activity going on within its walls. The louvered gable roof vents and columns lining the entry ways provide an almost Romanesque architectural feel.

The Phonics Lab and Dissemination

After entering the building, I find the main office secretary, who directs me to the north wing of the building toward the resource center. I head down hallways lined with art work and artifacts of student production. As I pass an open door I recognize a face I've seen before. Linda Newell looks almost exactly the same in person as she does on the educational publication that bears her picture. Linda invites me into her office. We sit at a small table surrounded by three desks, one for each person sharing the cramped office space.

Linda wears many hats at Delmar Elementary. After having spent a number of years as a teacher, she is now Chapter 1 coordinator and technology specialist. She supervises each of the three phonics labs located in the school, which are largely supported and staffed by the Chapter 1 monies the school receives. Approximately 77 percent of the school's students are eligible for Chapter 1. It was the phonics lab that first won Linda and the rest of her team, Pioneering Partners notoriety. The lab, now serving students in grades one through five, began four years ago as a program exclusively for first graders. Today there are both reading and math labs. Each class spends an hour or so during the day in the lab, usually navigating through three teacher-facilitated stations. At one station, you can find students using the computer to do reading practice sets from Jostens Integrated Learning System. At another station, the chapter teacher will be working with students around a circular table on strategies for learning. Students at the third station spend time learning and practicing process writing skills. The math lab is much the same with obvious changes in content. There is one difference though: One station dedicates itself to using and learning with math manipulatives. The school's goal is to use the technology to maximize students learning experience.

Linda and the rest of her team have worked hard to disseminate the reading and math laboratory experience and practice since receiving the Pioneering Partners award in 1992, the first year the school's program was put in place. "Finding out we got the award was a bitter-sweet experience," Linda relates. "We were ecstatic about the thought of being able to improve our skills and develop relationships with people who could help us extend our vision. But, we were disappointed by the reaction of the school board and district level staff and administrators. We were not acknowledged in any way, shape or form for our accomplishment."

Unfortunately, the team quickly dissipated as soon as the new school year started. One partner went on maternity leave and was then reassigned from first grade to fifth grade. Another of the four initial partners accepted an out-of-state administrative position. Two team members remained to carry on the dissemination tasks: Linda and Mark Mavor, a college of education faculty member at a local university. Despite the setback, "We went about our work the way we had planned," Linda remembers. The bulk of that work included delivering a number of presentations both locally and regionally. Because of a lack of local interest in what the team was doing, most of the presentations had to be held outside the school's large metropolitan school district. Team members attribute this circumstance partly to turf and pride issues. They speculate that for other teachers and administrators to visit the lab would be an admission that Delmar had a "leg up" in some sort of way. There was, however, another reason they found that explained this lack of local interest: time. The demands placed on some educators within the district utterly precluded them from calling on Delmar to see how they were using the technology. For this reason, the parents, staff, and administration at Delmar call themselves "the best kept secret in the district."

Outside the district that secret hasn't been as well kept. "Over the last year and a half we've had lots of visitors," Linda reflects. "Many of our visitors are just curious about what we're doing, others come taking copious notes on the structure and organization of our labs." Describing the level of dissemination of the school's educational technology, which is the goal of Pioneering Partners, that has taken place is difficult for team members. Quantifying dissemination in terms of numbers of techniques or strategies adopted is almost impossible because it's hard to tell who took what useful ideas home after a presentation at a professional conference, a visit to Delmar Elementary, or even a telephone conversation. However, Linda reports that two schools have adopted the Lab wholesale, and that she's worked quite closely with them to facilitate the transfer of Lab practice and procedure from Delmar to their locations. Linda also estimates that between some 50 and 100 other schools have imitated some portion of what is done the lab in their own schools.

Getting Local Support

The local building principal has done a great deal to generate innovations among his staff and to support them in their endeavors. However, said one team member, "It's been much more difficult to garner support in this city than we had imagined." For the last several years, the city's public schools have had a school-business partnering program in place. Delmar is partnered with is a small real estate development company with very limited cash flow and very little interest in making a substantial financial contribution to any single program or project in the school. When team members approached other businesses they frequently heard the response that the business was already partnered with another school and currently directing contributions its way. There were also businesses and charitable organizations that district administrators told

Delmar to stay away from because the district was already on their doorstep ready to make a request for some type of financial or in-kind contribution.

"One of the most disappointing realities of the whole process," Linda states, "is that the support we were counting on from regional and state legislators, state educational agency personnel and others we worked with at the Summit fell completely through" [A legislative panel attended the 1992 Summit, whose role was not to work individually with educators teams, however, many teams worked informally with legislative panel members at the Summit]. This experience is corroborated by Cheryl, a former partner of the team now fulfilling other responsibilities within the school: "When we got back it all flew in our face. The contact and work with legislators and heavy hitters at the Pioneering Partners workshop was all lip service." Both Linda and Cheryl report feeling a bit of disappointment when they frequently read and heard about the success of Pioneering Partners in smaller districts. "They were garnering great success," said Linda, "but we were flailing, so we reverted to a kind of quiet resignation, and went on about our work."

The inability to raise funds and rely on the assistance of legislative leaders only partly explains the resignation that Linda describes. The local sentiment against public city schools must also share the blame. During the week of my visit to Delmar Elementary, the city's major newspaper ran a weeklong series putting the public schools under the microscope. The Daily, among other barbs, claims that 90 percent of the students in the district fail to master basics skills on state tests, that district officials make unwise appropriation of funds on everything from classroom supplies to employee health benefits, and that the quality of teaching is in steady decline because of the mass migration of the city's finest teachers to the suburbs, where they are lured with the promise of greater salaries and relief from inner-city stress. Most assertions in the press, no matter what level of accuracy they arise to, are less than complimentary and in many respects disparaging.

At the forefront of these attacks on the educational system are local businesses and city leaders. The mayor has stated that the city has failed to attract new business because of the poor state of the public city schools. In an effort to turn the tide of failure, the mayor and other elected officials have decided to take over the educational system. Part of their plans includes a move to establish neighborhood schools and decreasing support for specialty and magnate schools. Site-based management is also a strategy city leaders are leaning toward for school governance. Most educators are willing to give these initiatives a try, but warn that city schools will continue to come under siege as long as test scores remain the barometer of school and student performance. "We're constantly being compared to township schools," one veteran teacher in the in the school points out. "Few individuals realize that city schools face problems unique than those of their suburban counterparts."

The emphasis on standardized test scores has also kept many teachers at Delmar Elementary from using the technology they've accumulated in a more productive way. This point is illustrated by the comments of Paul, a recent addition to the instruction and technology staff at Delmar. Paul was hired three years ago to assist with the implementation of the labs and aid Linda in her administrative responsibilities. "Most teachers are pressured by the need to have good test scores," he explains," so the computer continues to be used as a drill and practice tool for math and test-taking skills like punctuation, word definition, and reading

comprehension. Test scores are the only language folks downtown understand. And as long as teacher employment continues to rest on test scores, the technology will continue to be used in a restrictive way." Other teachers agree with Paul, but cite their inability to integrate computer use into their curriculum as a problem that also prohibits optimal technology use in their classrooms. However, they report they are diligently working on this problem.

This is the environment in which the Pioneering Partners team at Delmar labors. Many teachers in the district feel powerless describing the situation as "helpless and hopeless." However, while having legislators and administrators whom they thought were their friends turn their back on them, and under the constant barrage of offense, Delmar continues to make steady ground on the students' ability skills from K to grade three, and the Pioneering Partners team continues to be the toast of the region, except for in their own district.

Pioneering Partners Support

Team members are agreed that the ongoing contact with Pioneering Partners at GTE has been helpful and, in some cases, essential. However, their first experience with the program was almost enough to make some team members want no part of it. That first experience was the Pioneering Partners retreat in Connecticut in the summer of 1992. According to Mark, "The experience was very negative. The message that still resonates for me was, 'We have a whole lot to tell you, and you have little to tell us that's of any worth.' That was the whole sentiment of the presenters at the retreat. And it made all of us feel incompetent." Linda and Cheryl echo these comments, but with less venom than Mark. Delmar team members recall no blatant signs of this disrespect, but do remember that they were frequently reminded in more subtle ways of their ineptness and naivete. Mark adds, "There was only one staff that treated us with respect; therefore, she was the only one who had something of real value that she could share with us."

Besides their somewhat disappointing experience at the retreat, Delmar team members also point out how little impact the funds they were awarded had on their dissemination work. While trying not to sound ungrateful, team members pointed out that even $7,000 buys very little teacher time for dissemination activities; and when spread across a four-member group, the financial support lingers very briefly.

Linda indicates that all was not lost at the retreat. The concepts and ideas regarding dissemination she learned seemed sound to her. She rationalized that the team had failed at gaining local administrative and legislative support because it was either unfashionable for such figures to show a close affiliation with public city schools, or because these individuals were sold more on the rhetoric of educational technology use than the actual implementation of technological applications in the schools. Team members are agreed that the best product of their retreat experience was the regard they built for each other. Mark states, "The benefit of the Connecticut workshop for me was that I got to know the three other people on this team very, very well. We learned to know and trust each other. We gained a lot of confidence in each other and now we have a very good and productive relationship."

Calling this relationship productive can only be an understatement. Linda and her "adopted" Pioneering Partners team members have collected local, regional, and even national acclaim over the last several months. One noteworthy initiative has been the Junior Professors Program that sends several Delmar

students to the local university to "tutor" college of education students on various educational software programs such as Kidpix, HyperCard, or other math and language tutorial programs. The students eat lunch with the college of education faculty and are treated to a small tour of the campus. "The experience does wonders for the student confidence and self-esteem," Linda comments. The program has been reported on by the local media and was even featured on Good Morning America on September 20, 1994. The success that the Junior Professors Program has enjoyed has, as it roots, the experience of being Pioneering Partners, asserts Linda, "What we've been able to continue to develop has been a result, in part, of our continued relationship with Pioneering Partners."

Charting the Course From Here...

Delmar Pioneering Partners team members would like to say that they have had an effect on local policy that in some way has impacted the use of educational technologies in the school. Unfortunately, the district has focused their efforts on perhaps more essential, more remedial concerns. That educational technologies can be a solution to what have been enduring problems over the recent years is just dawning on the district. Delmar Elementary, on the other hand, has been more progressive in their thinking. In a district where the student-to-computer ratio is estimated at about 30 to 1, Delmar has expended its discretionary resources to attain a student-to-computer ratio of less than 5 to 1. An Office of Technology Assessment (1995) reports a nationwide student to computer ratio of 9 to 1. Besides just having the technology available, students and staff at the school are doing their best to use it to help them reach their fullest potential.

Linda reflects on her relationship with Pioneering Partners as a fruitful one, "There is an exchange of ideas and camaraderie that is very beneficial for me. I've had lots of opportunities and forged many relationships with other like-minded Pioneering Partners." With three years experience behind her and the rest of the team, they've learned to become much more resilient to resistant administrators and doubting colleagues realizing who they can and can not trust in the process of promoting the use of technology in the schools.

Case Study: The Secada Park Project: A Study in Transformations

Consistent with the rapidly changing nature of interactive computer technology, defining exactly what "the project" is in Susan B. Anthony School's Pioneering Partners dissemination effort is difficult for an observer to pin down. While dissemination is a consistent theme, the project itself has gone through a number of transformations since its origins in 1993.

Like many school-based technology applications, the project began as part of a plan to help students become more engaged in their learning. In this case, the plan authored by Shirley Crane, Secada Park district technology staff developer, and Jane Hermann, then third-grade teacher at Susan B. Anthony School, was to facilitate students taking charge of their own learning about state government. As it's apt title reveals, More than a Field Trip: Real World Government Connections was an attempt to create a deeper understanding about the legislative process than could be achieved by the typical bus trip and passive tour through the capital building. In this first phase, the project used a cellular phone, electronic mail, video telephone, speaker phone, cable, and fax to allow students in a third-grade classroom at Susan B. Anthony School to "roll up their sleeves" with State Representative James Randall to track a carjacking bill in the process of becoming a law.

The fact that this particular bill was snuffed out by superseding federal legislation and did not make it into law took nothing away from the learning experience for the third graders. According to Representative Randall, author of the bill and collaborator with the third graders via Internet, "The students got a chance to see real life, and the real workings of the legislative process. The fact is, bills don't always make it into law." According to the students' teacher, an assessment designed to compare what students in the project classroom and those who received the traditional curriculum learned, revealed that this real-life experience resulted in a measurably deeper understanding of the legislative process. The comments of Jack, a fifth grader who was a part of More Than A Field Trip Project sums up the experience for students. When asked if visiting the Capitol would help him more, he replied matter-of-factly:

> *Having more responses to my ideas faster would help me . . . less time in between posting an idea and getting response. Visiting the Capitol isn't going to help me get answers to them [the legislators] any better. You don't have to go there to come up with the answers.*

It was for this first phase of the project that the Secada Park School District and Susan B. Anthony School won the Pioneering Partners dissemination grant. The second phase of the project, Students Offering Solutions to Legislators (SOSL), expanded the original idea to allow students to help legislators find solutions to a number of complex community problems. This project allowed students to access other students from around the country using the State Legislative Gopher and the Secada Park Gopher connected to Internet. Through the Internet, students were able to read about a thorny legislative issue and review a photo and biography of the representative sponsoring the issue. Students were able to collect data on the issue using House and Senate Gopher information, newspaper articles, and student developed opinion surveys. They could work together with students from across the state and country by subscribing to a listserv and could post their solution

on the Minnesota Legislative Gopher for others to read. The project was designed so that a bill's sponsor would respond to students solutions on the Internet. As the project moved beyond one third grade classroom to connecting students to each other and their elected officials, the use of cellular and video telephone was discontinued. Since these high-tech tools are generally even less available to schools than computers, Internet access to gopher and e-mail became the primary technology vehicles for learning in SOSL.

The third phase of the project currently under way is a refinement in technology that will provide more students and classrooms with easier access to SOSL. In this newest phase, the project becomes more "user friendly" in an effort to boost replication. Project originators have found that it has to be easy or teachers simply won't have time to get the project off the ground. Therefore, instead of requiring students to access the project through Gopher, SOSL will be available on the World Wide Web through Mosiac. Using the Gopher version of SOSL meant that students had to access project information on goals and how to participate in one part of the system. They had to view posted issues, biographies, and pictures of representatives in another part. Finally, responding to the issue required a separate step. Students had to subscribe to an e-mail listserv to participate in discussion of the issue and post their solutions. While this process requires what amounts to only a few key strokes and mouse manipulations for a facile user, all of these separate pieces and the errors that could occur anywhere in the process make it somewhat cumbersome for teachers to orchestrate while trying to manage a classroom. Therefore, the new version of SOSL using Mosaic and Web forms will allow students and classrooms to access the project, learn about issues and their legislative sponsors, enter into interactive dialogue about issues, and post their solutions—all under one easy-to-use format.

What's next? At the time of the case study visits, project staff were working out the bugs in the WWW version of the project and were discussing how to further make SOSL more relevant by developing issues that are closer to students' experiences and by having students interview legislators and develop biographies that will make them seem more "human" and real to kids of all ages. Clearly, the focus of project staff has been on reinventing SOSL to make it easier to use and to replicate. While it is too early to tell, it seems likely that these efforts will increase the chances that dissemination will result in adoption by other schools and districts—or better than adoption, maybe changes will result in adaption of the overarching idea behind SOSL; that is, using interactive technology in all kinds of ways to get students involved in their learning.

Dissemination: The Good, the Planned, and the Unexpected

Although, according to project staff, dissemination has occurred in diffuse ways and often with surprises, the primary planned dissemination vehicle was conference presentations. Staff presented at a number of professional conferences (MEMO, TIES, MECC/TIES, etc.) Pioneering Partners support paid for substitutes and transportation and lodging depending on the location of the conference. Seeds planted at these conferences led to requests for presentations at specific school sites and districts in the metropolitan area: St. Croix Schools, Delaney Schools, and presentations to the Secada Park School Board.

While the Secada Park project activities cast a fairly broad dissemination net, even project staff were surprised at times by the fruits of their efforts. Jane Hermann described sending in a brief article about the project to Minnesota

Media, a publication that, among other things, highlights Internet projects. In this article, authors Hermann and Crane described the project and the process of reaching beyond the school doors to enter the relatively foreign world of state politics in order to create active learning opportunities for students. Not until the brief two-page article came out in the winter issue of the publication did Shirley and Jane realize that they shared kinship in that issue with another article written by the St. Croix Schools' library director, Vicki Rennolds. This article details the St. Croix Schools' replication of the SOSL project, including a description of the project, how to access it, and, most important, the particular steps they used to customize the project for their students. While, according to Jane, it has been impossible in all cases to tell exactly by how and by whom dissemination strategies have been received, the St. Croix article provides hard evidence that their efforts are not landing on deaf ears. In fact, Judy reports subsequent requests for technical assistance from the St. Croix Schools.

All dissemination activities, including developing program brochures for dissemination to a broad audience, required working closely with the House Research and Information Departments. Both Shirley and Jane, on the school side, and Grant Miller and Lief Ellery from the House of Representatives Information and Research Departments reported that collaboration was essential. Particularly, Grant and the House Information Office helped Jane and Shirley successfully navigate their way through the labyrinth of political terminology and protocol. This assistance was necessary both to implement the project and to create literature for dissemination that was sensitive to the need for correctness and precision in language required by the state legislature. Grant reported that working with Jane and Shirley on the project opened his eyes to the potential for using technology to work with schools and the public. While he acknowledged the reality that the majority of schools still do not have technology, the partnership with Secada Park helped him see new avenues for disseminating information about the House that have the potential to provide broader impact than the current practice of making isolated presentations in classrooms.

Shirley Crane describes the SOSL project as just one way that students can be linked with the real world experiences in their communities and beyond. She describes unintended targets of dissemination efforts including the State House of Representatives and, most recently, the Federal Reserve Bank. If an overarching goal of interactive technology is to link people and organizations, then the SOSL project has legitimate dissemination targets outside the schools. All those interviewed agreed that the project has been the catalyst for updating the interactive technology and networking capabilities of the House of Representatives, and for helping key House staff recognize that students have something valuable to offer them.

Shirley has made a presentation to the Minnesota Federal Reserve Bank about how they can reinvent their efforts to reach out to schools and students through interactive projects on the Internet. She has also described the potential to involve other government entities and corporations through efforts that build on the basic SOSL idea.

Lessons Learned

Data collected during the case study visits indicated the following themes or lessons learned through the Secada Park Pioneering Partners Project.

The Easier the Better for Replication to Occur

Principle project staff and House of Representatives collaborators spent a significant amount of time developing and maintaining the project. Substantial determination and team work on the part of the school, the district, the House Research Department, the House Information Department, and individual state representatives was necessary to get More than a Field Trip and its successor, SOSL, up and running. Jane and Shirley were willing to venture outside the school walls, take risks, and make themselves vulnerable within the foreign culture of the State Legislature in order to create new learning opportunities for students. They had substantial school level and district support for their efforts. Because experience, supports, personalities, and politics in all schools do not foster such risk taking, systems need to be as easy and user friendly as possible. Following the example of the Secada Park Project, other Pioneering Partners should be encouraged to define and pilot refinements to their innovations that make dissemination more meaningful and adoption a reality.

Dissemination Targets Two Levels

In the case of this project, dissemination of the SOSL project and getting more classrooms and students involved were the obvious goals. However, another potentially more important dissemination goal underlies the Secada Park Pioneering Partners Project story. That is, dissemination of the idea of innovation. Project implementors were careful to point out that SOSL is only one way to interactively connect students to their learning and their world. Given that all school and district contexts are different, it is highly likely that other locations will customize the project to a greater or lesser degree. It may also be that another site will have different needs that are not best met by the SOSL project. Thus, it is important that projects also be disseminated as ideas for innovation. Information should be presented that helps others replicate, not only the original project, but also a climate for innovation so that unique new projects can be created.

Evidence of True Partnership

It was overwhelmingly clear from visits to the school and the House of Representatives that the Secada Park site had established a true partnership. Theirs was not a story of a mightier bureaucracy or corporation doing a "good turn" for the schools. In interviews, House staff and Representative Rennolds gave the impression that the schools had given them something, that there was valued added on both sides by the arrangement. Specifically, the relationship prompted the House to reexamine its capacity for interactive technology (which astonishingly was lagging behind the school district's); indicated new ways for government to interface with schools; and provided legislators with information from the children of voters, who themselves will be future voters. This partnership has broader implications for the role that technology can play in helping schools and children be taken more seriously as having something valuable to offer the community.

Directions for GTE Pioneering Partners Supports

The transformations in the Secada Park Project underscore the need for change in order to support relevant dissemination. If project implementors had stopped refining their project and merely disseminated More than a Field Trip, it is unlikely that a broad dissemination audience would be maintained. Refinements that are specifically targeted to enhance dissemination and adoption efforts should be supported by the Pioneering Partners funds. Such supports provide incentives

for sites to take dissemination a step further and increase the potential for successful adoption.

One of the expectations of the Pioneering Partners grant was that the Secada Park Project staff engage in fund raising in order to provide additional support for expansion of the project. Project staff did solicit in-kind support, which allowed for the cellular telephone and air time during the first phase of the project. However, project staff did not succeed in raising matching funds. The project staff felt that, in their experience, intensive fund raising is not realistic when primary implementors have classroom or school-based responsibilities. If fund raising continues to be a priority of the GTE Pioneering Partners, it may be that school or district-based teams should be awarded the grants. Each team should have a principal, board member, or district staff person who can be primarily responsible for fund-raising activities. [These criteria for teaming have been in place since the inception of the program].

The Willow Township story is not unlike that of the childrens' literature character the Cat in the Hat. The Cat, renowned for leading his apprehensive guests from one adventure to another, recurrently finds himself in difficult situations, like once precariously balancing multiple objects in the air and upon having them fall from his grasp intercepts them just in the nick of time to save them from crashing to the floor. Or when the Cat miraculously cleans up his "mess" and disappears between the brief moment when the children spot mom coming up the front steps of the house and the moment she steps through the door. Although Willow's experience is not quite as dramatic as the Cat in the Hat's, it is none-the-less a series of episodes finding them "landing on their feet" when faced with seemingly insurmountable tasks. Responsible for these feats are good leadership, broad based school and community support, and a shared vision about what technology can accomplish in the school. This is their story.

About the Wilson Township District

The district is comprised of just over 1200 students located in two buildings. The high school houses grades 9 to 12, while the elementary and jr. high school composed of grades K-8 are housed in a single building. Willow is a township located in rural Appalachia. Its inhabitants are intensely proud of the school and its achievements. Just this year several of the school's athletic teams took states honors in their division. The focus on local school activities and athletics is underscored as a quick survey of the students in the elementary school playground finds them robed in "Pirate" colors, coats, hats and other apparel rather than that of NBA or NFL marketing mammoths like Chicago or San Francisco. The "Pirates" are the insignia/ nickname for the high school, and for the youngsters, identifying with the high school is much more important than identifying with college or professional sports franchises.

Willow is a primarily blue collar town. It inherits its blue collar ethic from nearby city of Parkside, where many of Willows residents commute each day to labor in the coke pits and steel mills of that industrial city. In contrast to the laborer ethic that many of the more senior residents were schooled in, a surprising proportion of their children attend college. Over 70% of their 1994 graduating class were enrolled in 2 or 4 year colleges or technical schools. A marginal statistical increase over cohort groups in the greater Appalachian region. With the focus on higher education, however, the population of the small town has begun to erode. While the high school class of 1990 included 103 graduates, the class of 1994 had but 92 graduates. Still, the school board, district, and community holds continued education as a standard for its youth.

Becoming Pioneering Partners

Ted Smith identifies himself as the accidental tourist when he describes his first experience with Pioneering Partners. Ted relates, "I did Pioneering Partners on a whim, I really didn't think we had a chance with them so I didn't set up any grand expectations for being accepted. But, you can imagine how we felt when we got the award." Ted is an art teacher at Willow High School and the main cog in the Pioneering Partners team. He's been at the school for over a decade and describes the art discipline as one "naturally given to multi-dimensional learning." Ted, and the rest of the team, including Rachel Tolbert, a member of the school board, Matthew Martin, a business

partner from Dow Chemical Corporation—now deceased, and Aaron Mallory, high school principal who has since left the district, initially proposed to Pioneering Partners the dissemination of educational technology applications for visually gifted students. This program had as its goal, the teaching of visually gifted students to use computers to create and generate electronic art. This enterprise is one that had garnered local and regional acclaim. And within the scope of the program, the team continued to receive broad praise and recognition through such efforts as the development of a curriculum guide to be disseminated state wide, development of a demonstration video to accompany curriculum materials, construction of various assessment rubrics and instruments to evaluate student art work, and procuring additional hardware to facilitate the creation of electronic art products in the school.

With ideas of expanded technology use in the visuals arts, The team gratefully and enthusiastically attended the first Pioneering Partners Summer Institute in Norwalk, Connecticut. Team members describe their experience at the Institute as nothing short of extraordinary. "I was overwhelmed by the level of training and quality," Ted reflects, "I've known nothing but constant support and the flow of good ideas and solutions form Pioneering Partners. It's made the difference for us." The "difference" has emerged as a goal that provides everyone in the Willow District, administrators, teachers, and students with access to educational technology.

The teams expanded vision was for a fully integrated technology-based curriculum for grades K-12. Their view of becoming fully integrated meant equipping all faculty with e-mail access, networking both school buildings and all classrooms, providing Internet and other telecommunications resources for all students, as well as developing instructional strategies that make optimal use of the technology.

Barriers to Dissemination

As much promise as the vision held, however, the plan initially faced a major hurdle. Most of the board of education and district administration at that time viewed the plan as unrealistic and unimplementable. Ted recounts, "It was like they were saying 'is this real or is this some kind of idea that he's got way out here. How are we going to fund it? Where's the money going to come from?' [It was] real pessimistic sort of stuff like that. And it was a real hard thing to take as a person who had been there and seen it work, talked to people who were doing the same kind of work. And coming back and facing the attitude, 'That's nice and everything, but...."

One of the biggest problems local leaders initially had with the plan was that it wasn't an innovation that started with them first. Ted describes the administration as one entrenched in "top-down" style of management. For that reason, the idea had little conceptual merit, and relatively little potential as a school improvement strategy. As good fortune would have it, only months passed before those who actually stood in the way of the implementation of the technology dissemination plan were gone, to be replaced by more progressive thinking people who endorsed the plan wholeheartedly. Ted retells an interesting story at the time of the transition in leadership:

> *When Sid was hired as the new district superintendent, he had a computer on his desk two weeks later. A week after then, the high school principal had a computer on his desk. About two months later, the elementary principal had a computer on his desk. The junior high and the elementary principals have a lap top that they keep on*

their desk and take home every night. Prior to Sid being hired, none of the administrators had computers. Four of the board members now have computers at home. They didn't have them before.

Another formidable task that Willow faced was obtaining the hardware. But, consistent with the trend that was developing for the district, events fell nicely in place. The majority of computer and networking equipment were secured through state Project Equity Funds to the tune of about $120,000. This grant not only provided hardware, but funds for fiber optic access and instructional media through public television. District in-kind funds tallied about $65,000, and other in-kind contributions from faculty and community totaled into the tens of thousand of dollars.

With computers and networking supplies at their disposal, Ted and the rest of the team faced the challenge of setting it all up and linking everyone together. Professional installation services would have cost more than they could possibly have afforded. That's when the district had an "electronic barn raising" which brought together several dozen people from the school and community to lay scores of miles of cable and hook up every computer to the network. The district drew upon the services of a GTE lineman whose specialty was in fiber optic installation. Personnel supporting the server at the local College in nearby Parkside also came to assist, as did many school faculty and students. When they were finished they had accomplished the almost impossible at a fraction of the cost. Funds and effort combined now result in complete access of a variety of educational technologies for students in K-2 and 7-12, and are working towards complete realization of their goal.

Impact

When Ted arranged for me to speak to a group of students about their experience with the technology in the classroom, a young man of about sixteen began, "if one more person asks me how computers have changed the way I learn I'll scream!" I respected his wishes by temporarily circumnavigating the issue. But when the conversation returned to how the technology improves the students learning the usual answers were offered, "it's more interesting, it makes learning funner, I can work faster, it gives me more options, I learn better by doing instead of hearing." However, besides modifying the delivery of instruction, the effort has been to move the role of the teacher from lecturer to facilitator of learning. This places the responsibility for learning more squarely on the shoulders of the learner, and supplants the teacher as the omnipotent possessor of knowledge.

The philosophy has bode well for the teachers in the Willow District. For example, Ted and I share a mutual appreciation for Macintosh computers over other types especially for educational, hypertext, and artistic applications. And as we tour his small collection of Quadras, scanners, and other audio/visual equipment, Ted mentions that they've just received a new piece of software called *Director* capable of creating multimedia presentations by combining illustrations, animation, sound and movies. Ted adds that he has yet to learn how to operate software, and with no signal of jest in his voice whatsoever, indicates that he will have one of the students show him how to use it soon.

Mr. Detmer, the chemistry teacher says, "our staff has learned that it's okay if a kid knows more than we do." Other teachers confirm this idea, "I'm not bothered that students know

more than I do, technology we disseminate, learning we don't, that's something we do together." There are still a few faculty in Willow schools entrenched in the traditional form of instructional delivery. Those faculty continue to believe that by putting technology in the students hand, you given them more power and begin to forfeit classroom control. However, these attitudes, says Ted, are becoming increasingly uncommon.

The final convincing indicator that technology had liberated and empowered both students and teachers is on occasions when students are observed teaching each other. Ted states, "The ultimate is to watch students that have worked with me teach other students. They're actually helping other students learn how to use software, or get on the Internet and find answers to their questions."

Why It Works

Two primary perspectives are offered that explain why the dissemination of the technology has worked so well at Willow Township. The new principal of the high school offers the first:

> *From what I can tell, Pioneering Partners is the catalyst that got things started, really. It was the first step to actually get money involved and get teachers involved and to get people excited. But it's been a grass roots push. It's not coming from the administrators. We support it, but the push is coming from the faculty.*

While nothing that the principle has presented lies in direct conflict with the way Ted feels about the programs success, he is a little broader in his placement of accolades:

> *You have to have a team of people from different areas, teachers, community people, administrators, maybe even board of education members working all together having the same kind of goal like we have. Understanding what the ultimate goal might be in that area you want to develop. Those people have groups of people that identify with them. That's why Pioneering Partners is right on track.*

While the concept of momentum strongly explains why dissemination works so well in the district, so too is the idea that the technology is able to fulfill a teacher or a students need. Ted explains:

> *To really be successful and to really work, you have to find out what their need is. Do they have a need? Can you think of something that the kind of work that they're doing presently, without the technology, could be enhanced with the technology? How could you accelerate things or make things more productive.*

Needs from word processing, to database use, to electronic organization and presentation of grades, to being able to design a nifty flyer or event program have been the impetus to bring teachers aboard.

Next

There are still barriers to cross. There are still a large segment of students in the district that have no access to educational technologies. Standing in the way of that goal is tens of thousands of dollars and is what faculty and administrators are working furiously to attain. Presently, a levy stands before the community members which, if approved, would make considerable funds available for educational technologies. If that fails, grants and contributions will continue to be sought.

A recent North Central Regional Education Laboratory, NCREL (1995), study identifies primary service needs in the state's rural schools. Foremost among those needs staff development in applications for technology.

Willows needs for continuing professional development are urgent. Currently, teacher/ facilitators in the school lead faculty, staff, and administration in the development of computer skills and software use. Teacher education faculty from nearby colleges also participate in technological inservice instruction. Several enterprising faculty are enrolled in masters programs emphasizing micro-computers in the classroom. This is not enough. As the technology and the needs of the faculty becomes increasingly sophisticated, the demand for continued instruction on in technology applications elevates.

Looming largest, however, in the way of optimal use of the technology in the classroom is the current method of student accountability. Proficiency testing continues to drive curriculums state and nation wide. But often, inquiry and discovery skills that students learn with the technology do not manifest themselves on standardized tests. One teachers relates:

I'm enrolled in a masters program for computer use in the classroom. I've got HyperCard stacks set up for students to carry out geometry projects and lots of other sorts of math activities. But, I'm forced to ask myself how this fits into my teaching day when I know that my kids have to pass the math part of the proficiency test. How does that fit in? Am I better off to teach to the test? How important is [the use of the technology] compared to the community's perception of my students not passing because we did computer exercises, instead of drilling on computational skills or completing all the chapters in the text?

To teach to the test, or not to teach to the test, an enduring question within a new context. Willow will be comforted to know that many other progressive districts are grappling with that scenario as vigorously as they are.

A Cross-Case Analysis

It is said that case studies are to evaluation what observation is to the social anthropologist. The case study approach is described as typical of the clinician more than the pollster; nearer to the historian than the demographer (Scriven, 1991). While causal explanations are the goal of both the case study on one end of the methodological continuum and the large scale survey on the other, the case study seeks to provide rich detail to the body of the evaluation. It is the attempt of this cross-case analysis to look across the individual experience of the four case studies and note common themes.

The Case Study Sites

Although these case studies represent a diverse mix of urban, rural, and suburban students across multiple ethnicities, the case study population is largely white. They spawn from both high schools and elementary schools. In some cases, generally in the elementary schools, technology instruction is teacher-facilitated; in other cases, it is self-paced and self-instructional. In all cases, technologies are present because key implementers believe they have the potential for moving student learning to a height otherwise unachievable through didactic or lecture models of instruction.

Although various educational technologies are often similarly defined, they can be quite different from each other. In these case studies, most use is made of computer-based technologies allowing students to access and manipulate information on micro-computers. In some cases, however, as in Secada Park, cellular and video telecommunications are also employed.

Effects on Educators

One common theme among all cases is that implementation of the technologies is backed by one or more visionary, committed, dynamic individual(s). The results of months and often years of work with the technology frequently catapult these individuals, usually teachers, into local and regional notoriety. The Weatherization Audit Training for Teachers and Students (WATTS) project at Eden Park Community High School collected several awards related to environmental education and integration of multicurricular subjects. The phonics lab at Delmar Elementary School eventually received wide press recognition and was one of the reasons Linda Newell received the Golden Apple Distinguished Teaching Award. Teachers facilitating the Student Offering Solutions to Legislators (SOSL) project also found themselves and their projects the focus of broad media attention. Ted Smith at Willow High School was invited to make more presentations about the use of micro-computers in the school than he possibly had time to schedule.

While these key implementers are satisfied with the progress of the technology dissemination projects, they are reluctant about being in the forefront and in the limelight of its success. At times, the notoriety had a price and it

often manifest itself in the form of difficulties on the implementors and their schools. Frequent requests are made by representatives of other schools, often from across state boundaries, to visit, observe, and study the educational technology. To host these visitors, accommodate them with extensive demonstrations, and provide substitutes is no small task. Nonetheless, key implementors realize that, while falling quite short of being indispensable, they are still critical to the project's success.

An additional feature these projects share is that they all receive broad and generally unconditional support from the local school administration. Clearly, these individuals work in an environment that encourages experimentation and risk taking. Reliable administrative support also helps implementors operate under the scrutiny of doubting colleagues. The value of administrative support is reflected in Ted Smith's experience at Willow High School. Ted notes that when administrators who were reluctant about the dissemination project's potential were replaced by administrators who supported the effort wholeheartedly, educational technology dissemination achieved interest and a speed of implementation that made previous efforts seem inconsequential.

Effects on Students

The case studies also demonstrate that behind each educational technology application exists an endeavor to make learning more meaningful for the students. In Secada Park, the technology is used to "create a deeper understanding about the legislative process than could be achieved by the typical bus trip and passive tour through the capital building." In Delmar Elementary School, the technology provides another instructional dimension to student learning in phonics and math. At Willow High School, technology puts the students directly in charge of their own learning. Educators in Willow announced that learning is a discovery activity that one teacher and student will do together. No longer will the teacher be the sole disseminator of information in the classroom. In Eden Park, authentic environmental tasks led to student-conducted school energy audits.

Making learning more meaningful for students means engaging them in tasks associated with and relevant to real life. Consequently, third graders in Secada Park Elementary School track the progress of an actual car-jacking bill presented before the state legislature. Tools used to assess student learning also retain that real-life quality. High School students at Eden Park conduct energy efficiency studies that imitate those conducted in business and industry. Solutions to address the energy inefficiencies have sometimes been found to even exceed those used in industry. These applications of educational technologies illustrate that the opportunities to relate student learning to real-life experiences is all the more possible.

Differences

The differences between these case study sites help one understand how common objectives can be attained from such diverse origins. Each of the four case study sites had significantly different adopting targets in mind when their dissemination efforts began. At Willow High School, dissemination reached no farther than the boundaries of it's relatively small rural district. Although Ted's appointment to state technology committees made his influence on educational technology policy statewide. However, what the dissemination efforts lack in bandwidth is compensated for in

fidelity because the implementor's goal is to equip every classroom in the district with a cluster of locally and regionally networked computers. At the same time, professional development will be provided to school staff that would make the use of the technology as efficient as possible.

Educational technologies at Secada Park and Delmar Elementary School stand as an open book for the whole world to read. Each school has plans for moving its educational technologies into other classrooms. In these two cases dissemination starts with the classrooms of colleagues within the building and eventually finds its way into classrooms hundreds of miles away.

The WATTS project at Eden Park had the dubious distinction of being both an adopting location for an energy efficiency project and a dissemination location as well. With adjustments to technology practices and procedures that make the weatherization audit process more suited to local needs, young would-be engineers traverse from school to school until over a score of schools have been involved in conducting energy audits.

In addition, while each of the case study sites share an intense interest in applying educational technologies, each also shows varying degrees of understanding of the use of educational technologies. For most teachers, educational technology use is not included in their formal training. What they know about the use of computer-based educational applications has been through experience that varies widely from educator to educator. These case studies show us, however, that even the most rudimentary understanding of educational technologies can have productive outcomes.

Pioneering Partners

For some of the case studies previously presented, Pioneering Partners was the stimulus that made educational technology application in the schools much more than a "nice little side project." At other points, Pioneering Partners propelled schools into dissemination roles they had previously imagined to be beyond their ability. In all cases, educators point to their involvement in Pioneering Partners as critical in their development as disseminators. Many having said they would not have possibly achieved their present success without them.

Finally . . .

Besides disseminating educational technologies, educator teams have worked to spread the practice of innovation and exploration among their colleagues. Just as surely as coalition building, grant writing, and dissemination building are tools of the effective disseminator, so are entrepreneurship, ingenuity, and persistence.

The effects of educational technology dissemination as presented in these case studies are broad. Impacts are present that have influenced teachers, students, schools, and communities. Key implementors have indicated that support, training, and assistance from Pioneering Partners have been valuable, if not essential to the dissemination effort. As illustrated in these case studies, dissemination appears to be traveling the enabling and empowering course that Pioneering Partners and participating schools have laid out.

Winning Teams Analysis of Funded Pioneering Partners Applications

Pioneering Partners asked NCREL to conduct a document review of the selection process. In order to conduct this analysis, the evaluation team requested that Pioneering Partners provide a random sample of 24 funded and 15 nonfunded project applications for years 1992, 1993, and 1994. Based on these samples, this review will provide a profile of some of the characteristics of a "Winning Application."

In analyzing the samples, the evaluation team found five important characteristics of a Winning Team:

- Use of innovative technology to improve learning
- Success in persuading others to adopt their projects or plans for expansion
- Evidence of team work and administrative support for the project
- Willingness to seek partners
- Use of assessment data to demonstrate increased student learning

An analysis of these characteristics follows:

Winning Technology

Essential to any successful project was the use of creative innovative technology. Teachers worked together to develop a curriculum using CD-ROM, scanners, LaserDiscs, and a multimedia work center. The Porter Middle Schools, for example, used HyperCard technology. The Porter HyperSchool Project used the Hypercard stacks to improve learning in language arts, math, and reading. This project is unique because it includes a private/public school partnership. A private suburban school, the Country Day School, teamed with the Porter Middle School, a public urban school, to share their experiences and develop the HyperCard stacks. The two schools were able to communicate their findings and even share work via modem.

Winning technology has also included an approach that actively engages the student. The Carson Toy and Trinket Company, composed of students and teachers at the Carson Middle School, designed, developed and manufactured a toy train. Students used math science, reading, and language arts in an interdisciplinary approach to develop this product. Additionally, winning technology required that students take responsibility for their learning. Quite often this included students teaming together to problem solve and provide creative solutions to a given situation. At the Carson Toy and Trinket Company, students were responsible for running the company and assessing the quality and design of the product. Student teaming was the key to the success of this project. They were responsible for running the company and making sure that every student had a role in the project.

Winning Dissemination

A typical Pioneering Partner dissemination project begins with successful school wide dissemination. The lessons of this experience are then organized into a formal presentation or workshop for an external audience. If a project is selected as a winning team, Pioneering Partners helps develop dissemination skills and a high quality dissemination plan at a five-day Summit. Many of the winning projects reviewed already had success in disseminating their project beyond the walls of their schools. The most successful of these projects were ones where the teachers have actively involved their entire school in the project. An example of this dissemination can be found at the Timothy Ball Elementary School where the teachers gave presentations of their "4 R's and Beyond" project at local, state, and national technology conferences. In addition to their presentations, the teachers developed videotapes that described the evolution of their project. Local and state media also played a role in informing the community and interested parties about the project. Other ways projects disseminated were through professional publications, newsletters, and workshops including teachers teaching teachers.

At Berkshire High School, the superintendent is a supporter of the "School of the 21st Century" project and is a recognized leader in implementing technological change. His advocacy for the project has led to even greater dissemination on a regional/national level as well as greater support for innovative technological endeavors.

Winning Teamwork

A critical element for every winning project is a full commitment from the team, the superintendent, and the principal to work together. This commitment involves planning time to work on the project and on staff development. The "Bridges" project at Waupaca High School demonstrates that sort of project commitment and support. The Waupaca team conducted workshops throughout the school and district to promote their innovative project. The administration has also supported the project by providing the teachers with the time to attend workshops and by installing the necessary equipment. Team work was particularly crucial to this site because of the international connection to this project. Waupaca High School participated in the "Hands Across the Sea" project, using telecommunications (fax, e-mail, VCRs) to connect with a school in Germany. Members of the teams and the administration had to work with German officials to develop this project.

It is also important for teams to include colleagues in both the planning and implementation of the project and to use consensus-building activities to create a sense of ownership. The "Creating a Climate of Learning at Avoca" project at the Avoca West School and Marie Murphy School emphasized the power of teamwork to include administrators, teachers and the community in any decisions. The feedback and communication among these groups could provide pertinent information for decisionmaking.

Winning Partners

Winning projects sought out and formed collaborations with community members, parents, business members, school boards, and other interested parties. Dwindling resources have created a need to seek support from nontraditional sources. Financial and nonfinancial (hardware, software, phone lines, etc.) assistance is vital to the continued success of a school. These projects have been

able to persuade partners that integrating technology into school curriculum is important. Collaborative efforts began with the nonparticipating school staff and moved out into the community. The "Applications of Technology" project at Clintonville High School had active partnership activities. Clintonville used the local Rotary Club as a vehicle to inform the local business and community members of project issues. These partnerships have led to generous contributions from the business community, prompting the school to acknowledge the partners with a "plaque of recognition" that this prominently displayed in their technology center.

Other winning projects have collaborated with local and state education agencies and one has found a partner in the U.S. Air Force Academy. The Academy has provided the "Foreign Language Interactive Videodisc" (IVD) project at Yorktown High School with foreign language software and lessons at no cost. They have also provided training and technical assistance for the teachers.

Winning Outcomes

All of the winning projects noted that their innovative technology projects contributed to the learning environment of the students. The biggest benefit of innovative technology was that it exposed the students to technology that will play a critical role in their futures. Another benefit is the increase in student performance. Teacher are noticing increased participation and an increase in attendance in the classroom. Several of the projects noted that they are now able to allow students to learn at their own pace, thus creating an environment where the student is more comfortable. This "hands-on" type of involvement would help students develop their higher order thinking skills.

All of the winning projects had assessment plans in place. Many of the respondents used a portfolio of the student's work to measure progress. At the Nicolet High School project "Music and Technology: A Two-Part Invention," student assessment was based on a portfolio of their assignments and on a peer review of their performance of musical compositions. Standardized tests were also used extensively in assessing student benefits and learning. In the Community College Preparation Program (CCPP) at West High School, 39 percent of the freshman class passed all sections of the Ohio Proficiency Test as opposed to 26 percent of total students. In the senior class, all of the students enrolled in the CCPP program passed the exam compared to a 76 percent pass rate in the class as a whole.

Summary

There are several characteristics that go into making up a winning profile. The Winning Project has many technologies, many types of dissemination, lots of team work, varied partners, and numerous outcomes. These varied projects continue to expand and promote the many different ways technology could be used to improve student learning.

Thoughts on Connections to Policy

One prominent goal of Pioneering Partners is to be able to influence state and local policy so that it is favorable to the development and use of technologies in the classroom. To determine the scope of policy influence, NCREL evaluators conducted extended telephone interviews with 10 policymakers and advisors across the Great Lake States. While only a few of the interviewees are in the position to form actual policy, others are in key positions on leadership and/or advisory councils directly responsible for impacting policy decisions. Roles for interviewees included state official, business/professional association president, a state operations director's, policy analysts, and legislators.

Individuals interviewed hold a high regard for the project in common. Most respondents view Pioneering Partners as an excellent reward and recognition for teachers who have taken risks to develop and integrate technology in their classrooms. Many interviewees note that Pioneering Partners frequently networks with other educators to raise awareness levels of educational technology issues. They agree that it is important to acknowledge and honor teachers who, as a group, are criticized by politicians and the business community for producing poor "products". Along with the recognition, the program helps to energize and enthuse teachers to continue their jobs at a high level. Said one policymaker, "GTE has put a lot of money into this program and the result is a first class operation."

A small number of respondents, however, indicate not seeing much legislation passed as a direct result of the Pioneering Partners program. These individuals are unaware of any state initiatives, bills, or legislation that have changed as a result of Pioneering Partners influence. This sentiment is illustrated by one respondent who said, "Why would this program affect a policymaker?" She went on to say the funds received by the project were minimal, so why focus on policymakers. She continued, "There are but a couple things that politicians listen to; one is people with lots of money to spend and the other is people with large blocks of voting power. Three educators can not impact policy."

The same group of respondents questioned whether the intent of Pioneering Partners is to focus on the connections made with policymakers in order to change or effect policy. Two individuals remarked that they are not sure if impacting policy is one of the goals of the program. The purpose, they argue, is to recognize outstanding technology and teaching, and to refine and implement dissemination strategies, not to influence policymakers. These comments are a telling portrait of a cadre of important stakeholders, who remain convinced that policy influence is out of the reach of educator teams, and that Pioneering Partners influence on policy is inconsequential at best.

Another respondent skeptical of Pioneering Partner impact conjectures the program does not attract cutting edge projects. "The Summit is a great help," he confirms, "but there needs to be more incentives during the school year for teachers to participate in the program." One legislator indicates, "many of the technologies that Pioneering Partners have discovered, the state is already aware of. In Indiana, the state has been working with nearly all of the Pioneering Partner school's and were aware of several of the exemplary projects." Clearly, the fact that Pioneering Partners is about empowering educators and improving learning and instruction through their professional development, rather than "cutting edge stuff" is lost on this respondent.

To contrast the perceptions of those who believe educational technology policy influence exceeds the reach of Pioneering Partners is the experiences of a larger group of respondents who cite numerous incidences of policy influence. Many of the experiences they recall are relatively minor and/or region specific. For example Governor Tommy Thompson of Wisconsin meets with winning Pioneering Partners each year to discuss their educational technology dissemination projects and the barriers still existing for them in achieving their goals. One small change that resulted from these conversations is that in past, according to old legislation dating back to the days of business education, teachers could not teach keyboarding skills outside the classroom. That policy changed so keyboarding skills could be taught in the library and other places by any competent teacher. This move makes student access to these skills much more available.

Greater awareness of technology issues through involvement with Pioneering Partners another respondent notes, is the need for linking state Distance Learning programs. Policy- makers and planners have been able to parlay this awareness into increased funds out of the state budget for the delivery of distance instruction by educational telecommunications technology by over 80% in a time when budgets are being cut. Another state official indicates that the governor has set in motion a plan to connect the Internet to each school in the state. Pioneering Partners has helped contribute to his understanding of the importance of technology in schools.

A particularly telling testimony is provided by Frank C. Watson, Assistant Majority Leader of the Illinois State Senate. Mr. Watson, the chairman of the Senate Education Committee has introduced a number of bills to the senate addressing educational technology needs in the state. When Mr. Watson was asked what proportion of motivation he attributed to Pioneering Partners for writing these bills, he enthusiastically replied, "Pioneering Partners is everything. I didn't know anything about technology in education until I learned about the program and researched some of it's effects. All of this experience comes through Pioneering Partners and people that I know in the program."

Besides directly influencing policy, Pioneering Partners does a great deal to facilitate key relationships. GTE's link with the Council of Great Lakes Governors and other politicians has resulted in strong and long term relationships with Pioneering Partners team members. One state official indicates that their relationship with Pioneering Partner team members carries over to other projects in technology and education. On one occasion, when an opening on the governor's educational committee became available, a Pioneering Partner team member was asked by the governor to fill the seat. Also, another Pioneering Partner team member was asked by the governors office to participate on the Goals

2000 Technology Committee. To date, a number of Pioneering Partners team members state wide participate in conferences and state level meetings to publicize their program.

Several policymakers emphasize that for Pioneering Partners to have a greater presence in each of the participating states, Governors have to encourage and support teachers towards using technology in the classroom. One interviewee comments, "The Council of Great Lakes Governors deserve a lot of credit and praise for the success of this project." In Wisconsin, the governor is an active participant in the project and has demonstrated his support by allocating 10 million dollars to give the project a higher profile and to make the state application process more competitive. The legislation is expected to pass without reductions to the line item. Other governors give differing levels of support to the project. Recently, though, in two of the Great Lake States, gubernatorial changes have led to some indecisiveness and uncertainty about the priority the project in those states. However, Pioneering Partners will continue to be an integral piece of education technology dissemination in those states.

All of the policymakers interviewed strongly support the work Pioneering Partners does to create greater awareness of technology issues within the region. Policymakers agree that this project is useful to them because it allows them to talk directly to teachers, so they know what is going on at the grassroots level. Information from the teachers will help address barriers and gaps in educational technology needs. Also, to be a more effective program, respondents agree that the Council of Great Lakes Governors must make a greater commitment to the project in their states. They must commit resources and/or personnel to give this a higher priority, as did one governor in a participating state, who named his executive assistant to the advisory team and is having him lead the Pioneering Partners program for the state. Also, respondents to inquiry on policy concur that if Pioneering Partners is to have greater influence on policy, it has to show the governors why this project is important to them and the decisions that are made about educational technology. Governors are very busy and need to clearly know how this program can help them.

Interviews with key educational policy decision makers show that perspectives fit in primarily two camps. At the smaller fire sits a group that considers the influence of Pioneering Partners on educational technology policy largely negligible, except for in very local situations. They cite the small constituency that Pioneering Partners addresses and serves as a reason for low policymaker interest. At the fire burning more brightly, however, respondents tell of a substantial impact on educational policy by Pioneering Partners. In some cases, Pioneering Partners is the exclusive motivation for legislation. This information supports the findings of the questionnaire, as questionnaire respondents indicate that they have indeed influence local and state policy regarding educational technology use and dissemination.

Synthesis, Discussion, and Recommendations

Across all data sources, considerable evidence exists to show that the Pioneering Partners program is achieving its primary goals. By recognizing the most innovative teachers using technology in the classroom, Pioneer Partners empowers teachers to join and build coalitions with a large number of stakeholders to effect systemic educational reform. The opportunities for preparation that Pioneering Partners has provided these educators is largely responsible for the reform they're initiating.

And the process of dissemination itself is broad and far-reaching. Not only is there more educational technology, but more time is being spent with the technology. Not only are there more teachers employing educational technologies in the classroom as a result of the project, but the sophistication of these technologies is at a higher level than it has ever been before. While other efforts have focused on the development of educational technologies themselves, Pioneering Partners has concentrated its energy on deploying these technologies so that they quickly find and serve their intended audiences. This accessibility to educational technologies answers the call made by educators, scholars, parents, and community leaders for educational change.

Besides meeting the goal of disseminating educational technologies throughout the Great Lakes area, Pioneering Partners appears to have cultivated a relationship with its educator teams that serves them both quite well. Without exception, participating teams indicate that Pioneering Partners are instrumental in helping them achieve dissemination results. Pioneering Partners also report that they continue to maintain relationships with well over 95 percent of the funded teams of the last three years. This relationship presents a successful collaboration model from which both business and education can learn.

After three years of program implementation, Pioneering Partners also appears to have achieved a balance in technical training that matches the instructional needs of educator teams. This balance gives participants the confidence they need to realize dissemination results. Clearly, Pioneering Partners' support has been more than providing participants with the proverbial fish so that they have a day's meal. Rather, it has been a lesson in fishing, so that the capacity for dissemination lasts a lifetime.

This evaluation poses several recommendations for broadening Pioneering Partners' potential and raises some issues requiring further consideration. These recommendations speak to some of the more distinctive findings within the data that give cause for reflection. Rationale and discussion accompanies each recommendation.

***Recommendation 1*: The data show that dissemination in urban areas is qualitatively different than in rural or suburban areas. With the challenges that urban educators face with dissemination, this evaluation recommends that strategies be implemented to better assist them in achieving their goals.**

Throughout the data in the survey, in the case studies, and in other methods employed by the evaluation, definite differences emerge in how subsections of educator teams view their experience. Data from partnerships in suburban areas show that with the store of resources they have—time, money, administrative and technical support—dissemination generally achieves reasonable success.

In rural areas, resources are less abundant. The importance of resources is apparent in the ratings rural respondents give the support provided by Pioneering Partners. In almost every case—technical support, financial support, materials, resources, recognition, etc.—rural partners provide the highest ratings of usefulness. For rural educators, continued resources are a necessary companion to the motivation and drive they display towards achieving dissemination results.

The challenges urban schools face are not ones of lack of motivation or massive lack of resources, but rather of collaboration and implementation. Responses from the questionnaire show that urban educators are twice as likely to modify and/or abandon their dissemination plans as their suburban or rural counterparts. As the questionnaire data also points out, urban schools face significantly more nonsupport and dissemination impediments from administrators and teaching peers than do suburban and rural schools. Local and broad-based collaboration efforts are less likely in urban schools. Educator teams in urban schools are also likely to wonder if their efforts are sufficiently valued so that they could enact a change in a politically volatile environment such as their public schools.

Often, educators in urban schools face a day-to-day challenge of making their classrooms safe for their students. These efforts make even the slightest progress in dissemination a cause for applause. Finally, urban educators are three to four times more likely than their rural and suburban counterparts to say that their lack of dissemination understanding inhibited dissemination strategies. This, in light of the fact that urban teams received the same instructional development that other teams did, comes as a startling portrayal of how problematic dissemination can be in urban schools.

These data and anecdotes give evidence that a qualitative difference exists between dissemination in urban schools on the one hand, and rural and suburban schools on the other hand. Consequently, this evaluation recommends that Pioneering Partners give further consideration to what these differences are and implement strategies that ensure greater success of dissemination in urban schools. These strategies might include break-out sessions addressing the uniqueness of dissemination in urban schools or the provision of technical support that is more attuned to urban needs.

Recommendation 2: **With the increasing importance the nation's parents, teachers, industry leaders, and scholars are placing on math and science instruction, the evaluation recommends that Pioneering Partners work to turn the tide of declining projects in these two areas by encouraging quality applications, and eventually funding projects that would respond to math and science priorities.**

With each successive year of implementation, Pioneering Partners experiences decrease in the number of funded projects that address math and science as content areas for dissemination. The decrease in calculators as an educational technology tool, a tool traditionally used for math instruction, also gives evidence to the decline in math- and science-related projects. It may be, however, that Pioneering Partners experiences a decrease in the amount of *quality applications* that target outcomes in math and science. It is also possible that educators are still exploring alternatives using educational technologies that would satisfy their instructional needs in these areas. If it is a case of the latter, the need for disseminating worthy programs in science and math is even more essential. Given recent legislation that targets math and science instruction (Goals 2000, 1994) as the nation's priority, and the growing body of literature that indicates that the United States trails other industrialized countries in student performance in math and science (Federal Coordinating Council for Science, Engineering and Technology, 1993; Nelson, Weiss, and Conaway, 1992), it behooves Pioneering Partners to encourage quality applications and funded projects in these areas.

Recommendation 3: Interest in educational telecommunications technology has experienced rapidly increasing interest from educator teams. And while Pioneering Partners have used telecommunications to support educators teams, the evaluation recommends that telecommunications also be considered as a reporting and evaluation tool for partners. Additionally, while telecommunications technology should be encouraged to be a tool by which quality instruction is delivered, it should also be explored itself as a medium for dissemination instruction and activities.

While calculators and the laptop computers have experienced steady declines as technology vehicles for instructional content, telecommunications have found significantly expanding interest. Growth in educational telecommunications technology use is evidenced by the increase in the amount of applications and proposals funded by Pioneering Partners. Educator teams have also identified ongoing telecommunications support as the most useful and necessary feature of support provided by Pioneering Partners. With the likelihood that interest and use of telecommunications technologies will grow substantially over the next few years, the evaluation recommends that Pioneering Partners build on their work in telecommunications as a communication, reporting, and evaluation device between Partners. Additionally, while telecommunications technology should not only be encouraged as a tool by which quality instruction is delivered, it should also be explored as a dissemination tool as well.

***Recommendation 4*: To encourage local, regional, state, and national policy facilitating the use of educational technologies in the classroom, best results are likely when a grassroots push is emphasized involving the entire constituency affected by the technology's use: students, teachers, parents, and community members. Likewise, the small number of legislators and policy advisors who have yet to learn about the potential Pioneering Partners has for influencing educational technology policy the less of a barrier they present for future legislation supporting the use educational technologies in the classroom.**

Educator teams report that they have been fairly influential in contributing to policy decisions related to educational technology. The influence is largely more local than statewide. However, the impact on statewide policy should not be negated. Interviews with policy makers and advisors unequivocally show that significant effects on state level educational policy can be directly traced to the influence of Pioneering Partners. And while impacts at a larger level are infrequent, scope and duration of impact more than compensate.

Implications for policy are three-fold. First, because collaboration has become a hallmark of the Pioneering Partners process, it serves local needs and specific interests well. Consequently, influence on policy appears to be in the places where it's most important, in local schools and communities.

Second, it is likely true, as one informant to this study says, that many legislators listen to people with lots of money to spend and to people with large blocks of voting power. Affecting policy then means that a more grassroots effort is necessary. When students, parents, teachers, and community members share their experiences of how learning and the quality of teaching in the classroom has improved, the more likely the support for favorable educational technology legislation.

Finally, a smaller body of policy and advisors exists, who are unfamiliar with the positive impacts of educational technology on teaching and learning, and more specifically, the influence of Pioneering Partners on policy considerations. The more these skeptics know about the program the less of a barrier they become to school change.

***Recommendation 5*: Require applicants to be more specific about learning objectives, goals, and outcomes and how the technology proposes to delivers those outcomes.**

An analysis of a sample of the Pioneering Partners applications reveals that most are absent of clear, defined goals for student learning. While most applications identify what the students will or will not gain from the experience, these defining brush strokes were broad and ambiguous. Statements like "the program is designed to improve student writing in all curricular areas" and "our first desired outcomes is [sic] to have students write and publish a book," characterize learning goals. When applications list what outcomes they've observed and/or expect from their project, educator teams frequently list "cooperative learning" or "problem solving." Such general language lacks the clarity necessary to determine exactly what the students will be able to do after their learning experience using the technology. In instances where outcomes in student learning fail to drive, but rather, are driven by technology use, students are no longer at the point of our combined effort to improve education. If learning objectives are more specific, and if the evidence is articulated that educators are willing to accept to determine whether the goals are being reached, then educator teams have a framework for self-evaluation.

***Recommendation 6*: Assist educator teams in understanding the research and literature on learning to provide a common language by which to communicate; assist educators in conducting their own research; and build the connections between teacher, researcher, and policy maker.**

Scant communication exists between educator teams who win Pioneering Partners awards for their "best practices" and cognitive research in these areas. Many individuals who are interviewed in the case studies believed that students involved in real-world experiences and engaged in gathering authentic data for learning experiences produces more meaningful learning. Educator teams arrive at these points of view though intuition and years of experience. However, scholarly literature on cognitive learning, which is based on the experience of practice and research, provides readily accessible information to those without the luxury of experience. When educators access this information, they find cognitive research language that helps them validate what they are learning and gives them all a common language such as "authentic task," "student as leader," etc., to talk to each other with. This knowledge also builds bridges between the teacher, research, and policy maker. The result would be that policy makers would have both the experience of teachers and research to impact decisions.

***Recommendation 7*: Link Pioneering Partners to other national dissemination agencies such as the National Diffusion Network (NDN) and other databases of successful practice.**

While GTE and The Council of Great Lakes Governors sponsor one of the more progressive educational technology dissemination projects currently running, there are a number of other efforts whose goals and objectives are analogous to that of Pioneering Partners'. It would be beneficial to link the Pioneering Partners program to national dissemination agencies. Such partners might be the National Diffusion Network (NDN), ERIC clearinghouses where the products and papers of educator teams can be microfiched for availability nationwide, and Regional Educational Laboratories (RELs), ten of which can be found nationwide, three of which intersect the geographical region that Pioneering Partners covers. These Labs, whose Office of Education Research and Improvement contracts require them to make and keep contact at each of the schools throughout their respective regions, have formed broad dissemination networks of their own, which may also serve as an appropriate vehicle for the dissemination of successful practice in technology application engineered by Pioneering Partner Schools.

***Recommendation 8*: Educational technology adoption at dissemination locations has not reached it's full potential. Many dissemination efforts curtail because of the lack of prolonged support by schools and other agencies with resources. To achieve more sustained use of educational technologies, more and continuing support is necessary.**

Data on educational technology use in the classroom show substantial increases due to Pioneering Partners impact. In many instances, however, use declines after key dissemination and implementation role players leave. The implication is, where educational technology implementation and resulting dissemination involve major paradigm shifts for teachers, efforts are likely to curtail unless there is more support for teachers. This support has to come from schools, or other agencies or businesses to allow educator teams sufficient time to make sure that dissemination achieves a lasting effect on teachers and on the technology adoption process.

***Recommendation 9*: While Pioneering Partners encourages a team approach to dissemination, partners have been scarcely able to broaden their teams so that efforts are strengthened and renewed with the inclusion of new talent. To avoid overburdening initial team members and to make the effect of dissemination systemic, training and resources are in more need than ever before to empower educator teams, and to develop new team members with capacities and abilities in educational technology use and dissemination equal to their own.**

Dissemination among Pioneering Partners efforts have been criticized by some observers as less than systemic. Many educator teams have failed to enlarge their influence directly in their own schools and across multiple grade levels and content areas. This effect is clearly a result of the shortage of resources. However, it presents an interesting issue for Pioneering Partners to address: Should the program focus on building teachers as change agents, or should Pioneering Partners be looking to empower teams of teachers so that the effect is broader? Currently, Pioneering Partners encourage and support the team concept. But, Partners who leave the Summit do little to spread the team concept during dissemination. Team members become burdened as the work of dissemination grows, taking quality teachers away from the classroom with greater frequency. Here, then, is a rationale for providing training and resources to empower educator teams to develop new team members with capacities and abilities in educational technology use and dissemination equal to their own.

Appendix A

Pioneering Partners

Cover Letter and Questionnaire

March 15, 1995

Dear Pioneering Partner:

As you know by now, GTE and the Council of Great Lakes Governors has asked the North Central Regional Educational Laboratory to study the dissemination experiences that Pioneering Partners participating schools have had over the last three years. In developing an evaluation design that responds to the many information needs that GTE and the Council of Governors have, we've proposed several methods.

The most expansive of these methods is the survey enclosed with this letter. This survey asks several questions about the scope of your dissemination efforts; about the time and effort you invest in the program; and about the experiences you've had during the course of your involvement.

It is very important that you complete this questionnaire as candidly and thoroughly as possible. The survey has been coded which will allow us to analyze the responses by funding year and state. However, your specific responses will be held in the strictest confidence. All information will be reported to GTE and the Council of Governors as summary data.

It is hoped that this information will help GTE and the Council of Great Lakes Governors improve the support they provide and work towards possible broader participation by additional schools in the coming years.

The results of your responses will be available to you this summer through Brian Crosley and Mary Kinney at GTE. Please mail the completed survey back to us in the pre-paid postage envelope provided by March 24, 1995. If you have any questions, call us toll-free at (800) 356-2735 and ask for Mark Hawkes or Merrill Chandler. Thank-you for your help.

Sincerely,

Mark Hawkes
Evaluation Specialist

Merrill Chandler
Program specialist

Pioneering Partners Questionnaire

A product of the North Central Regional Educational Laboratory

Please respond to following questions as thoroughly as possible using the scales provided. When you are finished, please return the survey in the postage paid envelope provided.

1. How would you ***describe*** the educational technology you've worked to disseminate? (Check all that apply)

☐ K - 5	☐ Art	☐ Video Production
☐ 6 - 8	☐ English	☐ Local Area Network
☐ 9 - 12	☐ Social Studies	☐ Telecommunications
☐ K - 12	☐ Sciences	☐ Classroom Computers
☐ Other: _____	☐ Math	☐ Computer Labs
	☐ Vocational	☐ Laptop/Calculators
	☐ Music	☐ Other: _____
	☐ Other: _____	

2. How would you ***describe*** your role:

- ☐ Classroom Teacher
- ☐ Curriculum/Technical/Media Specialist
- ☐ Administrator
- ☐ Community Partner (Parent/Business/School Board)

3. Please indicate if the following factors either ***inhibited*** or ***facilitated*** the dissemination of your program. Then indicate the ***degree*** (minimally, somewhat, or very) to which the factor either inhibited or facilitated dissemination.

	Inhibiting	Facilitative	Minimally	Somewhat	Very
Administration	☐	☐	1	2	3
Local and broad-based collaboration efforts	☐	☐	1	2	3
My knowledge of the technology	☐	☐	1	2	3
Believing I could really do something of value	☐	☐	1	2	3
Financial resources	☐	☐	1	2	3
Available time	☐	☐	1	2	3
Peer support	☐	☐	1	2	3
Pioneering Partners resources and materials	☐	☐	1	2	3
My understanding of dissemination strategies	☐	☐	1	2	3
Other_____	☐	☐	1	2	3
Other_____	☐	☐	1	2	3

4. To what ***degree*** did the following ***conditions*** prompt the implementation of your educational technology? Please respond for yourself and then the adopting locations (AL's) with whom you've worked towards dissemination. (Circle an alternative to each condition for both yourself and the adopting locations)

	Not a Factor in Initiating Implementation		Moderate Factor in Initiating Implementation		Major Factor in Initiating Implementation	
	Self	AL's	Self	AL's	Self	AL's
Dissatisfaction with the status quo—knowing things could be done better	1	1	2	2	3	3
We have people with the knowledge and skills	1	1	2	2	3	3
Resources were/are available (computers, software, etc.)	1	1	2	2	3	3
Time was/is available for key implementers	1	1	2	2	3	3
Rewards or incentives were/are available ($, recognition)	1	1	2	2	3	3
Opportunities were/are available (new ideas, additional resources)	1	1	2	2	3	3
Participation was/is expected and encouraged from those implementing the innovation	1	1	2	2	3	3
Commitment by key implementers/stakeholders was/is present	1	1	2	2	3	3
Leadership and continuing support was/is evident	1	1	2	2	3	3
Was/Is forced to participate	1	1	2	2	3	3
Other_____	1	1	2	2	3	3

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5. Of the ***levels of technology use*** listed below, please ***identify*** by percentage (%), the ***highest level*** that adopting locations have achieved so that the total equals 100%. For example, 25% of your adopting locations may still be at a decision-making phase (#2), 55% may be at a phase of routine use (#4), while 20% may be exploring alternatives for modifications (#7), accounting for 100% of adopting location use.

____% 1. Takes action to learn more detailed information about the technology
____% 2. Makes a decision to use the technology and sets a time to begin
____% 3. Works step-by-step to master the features of the technology
____% 4. At a routine pattern of use
____% 5. Evaluates the technology and makes adaptations
____% 6. Collaborates with colleagues to adapt the use of the technology to meet individual needs
____% 7. Begins exploring alternatives for major modifications to broaden the technology's use

100% adopting location use

6a. From ***what sources*** does your time come, and ***how many hours per month*** on the average would you estimate you spend on dissemination activities?

During School Year:
____ Hrs. per/month—Released time by your school/district
____ Hrs. per/month—Planning time allowed as part of your school day
____ Hrs. per/month—Personal time
____ **Total Hours per/month during school year**

During Summer:
____ Hrs. per/month—Released time by your school/district
____ Hrs. per/month—Planning time allowed as part of your school day
____ Hrs. per/month—Personal time
____ **Total Hours per/month during summer**

b. Of the time you ***dedicate to dissemination activities***, what ***percentage*** is spent in the following activities:

____% Obtaining funding
____% Awareness
____% Planning
____% Evaluation
____% Consulting
____% Actual adoption
____% Other:_____

100% Total Time

7. In locations where you've worked to achieve adoption, how would you describe the ***level of activity*** of educators along the following dimensions?

	Not Active	Somewhat Active	Moderately Active	Very Active
Knowing the characteristics and capability of the technology	1	2	3	4
Seeking information about the technology in a variety of ways	1	2	3	4
Discussing outcomes, plans, ideas, and problems related to the use of the technology	1	2	3	4
Assessing the strengths, weaknesses or actual use of the technology	1	2	3	4
Carrying out the actions and activities entailed in the adoption of the educational technology	1	2	3	4
Organizing and *coordinating* steps leading to technology adoption	1	2	3	4

8. How did your dissemination activities ***align*** themselves ***with your goals***? (Choose only one response)

- ☐ Followed plan as developed
- ☐ Followed plans with modifications in timeline or budget
- ☐ Modified plans to respond to broader goals
- ☐ Modified plans due to unrealistic goals
- ☐ Followed most aspects of the plan
- ☐ Abandoned plan
- ☐ Other: _____

9. Why did you to modify or abandon your plan?

10. Please rate the ***usefulness*** of the types of support provided by Pioneering Partners. Rate both the usefulness of ***initial support*** followed by the usefulness of ***ongoing support***.

	Initial Support:					Ongoing Support:				
	Didn't Use	Not Useful	Somewhat Useful	Moderately Useful	Very Useful	Didn't Use	Not Useful	Somewhat Useful	Moderately Useful	Very Useful
Materials/resources	☐	1	2	3	4	☐	1	2	3	4
Technical support	☐	1	2	3	4	☐	1	2	3	4
Receiving recognition	☐	1	2	3	4	☐	1	2	3	4
Financial support	☐	1	2	3	4	☐	1	2	3	4
Dissemination skills development:										
coalition building	☐	1	2	3	4	☐	1	2	3	4
grant writing	☐	1	2	3	4	☐	1	2	3	4
presentations	☐	1	2	3	4	☐	1	2	3	4
telecommunications	☐	1	2	3	4	☐	1	2	3	4
dissemination planning	☐	1	2	3	4	☐	1	2	3	4
media relations	☐	1	2	3	4	☐	1	2	3	4

11. Listed below are several possible dissemination impacts. Please indicate the ***breadth of impact*** before dissemination occurred and then after.

	Before Dissemination of your program	*After Dissemination...* ...of your program	...with technology use beyond your program
Number of students participating	_____	_____	_____
Number of teachers participating	_____	_____	_____
Number of coalition partners participating	_____	_____	_____
Number of schools participating	_____	_____	_____
Accumulative hours of technology use by students per week (hours x number of students)	_____	_____	_____

12. Of the significant strides your team has made in dissemination of educational technologies since you were named to Pioneering Partners, how significant has Pioneering Partners role been in that success? (Choose one)

☐ Not significant ☐ Somewhat significant ☐ Moderately significant ☐ Very significant

Please explain and elaborate on your response.

Please respond to the following open-ended questions below as detailed as you can. Use additional paper if necessary.

1. Comment on the support you've received from Pioneering Partners. What have you liked? What have you disliked? How could the support be improved?

2. How has what you've learned at the Summer Summit helped you continue your dissemination efforts over recent months/years? How do you feel the Summit could be improved?

3. Has local, regional, or state policy regarding the use of technology changed as a result of your teams efforts? Briefly describe the change and how much can be attributed to your involvement in Pioneering Partners.
   ☐ No change in policy

4. Has this program helped your school develop institutional relationships or resources with policymakers? How?

5. Describe the *impact* your dissemination efforts have had on student learning. (e.g. How has the student experience been affected? How has the teacher experience been affected?)

6. Has your involvement in Pioneering Partners moved you into regional and statewide leadership roles in using and disseminating educational technologies? Please describe those roles and your involvement.

   How is your relationship with Pioneering Partners helping you in this regional and/or statewide role?

7. What other types of support (actual/in-kind) have augmented your dissemination or technology implementation efforts since your involvement in Pioneering Partners? Breifly list the type and value of the support.

   Source/Description: **Value:**

Please list any other comments on additional paper. Thank-you very much for your time and responses!

Appendix B

Survey Data Summary Tables

Survey Data Summary Tables

Factors inhibiting the dissemination of the educational technology.

	Total	Urban	Rural	Suburban
Administration	16.6%	31.2%	24.2%	*6.2%
Local and broad based collaboration effort	5.7%	*37.5%	1.6%	1.6%
My knowledge of the technology	12.4%	12.5%	16.1%	9.2%
Believing I could do something of value	0.7%	6.7%	0.0%	0.0%
Financial resources	43.6%	37.5%	50.8%	36.1%
Available time	74.3%	87.5%	77.4%	68.8%
Peer Support	9.1%	*33.3%	6.6%	6.2%
Pioneering Partners Resources and Materials	0.0%	0.0%	0.0%	0.0%
My understanding of dissemination strategies	5.6%	12.5%	4.8%	3.1%

**Significant at the 95% level for an independent Z-test for percentages*

Conditions prompting implementation for yourself.

1—Not a factor in initiating implementation
2—Moderate factor in initiating implementation
3—Major factor in initiating implementation

(Mean Scores)

	Total	Urban	Rural	Suburban
Dissatisfaction with the status quo	2.6	2.8	2.7	2.5
Having people with the knowledge and skills	2.4	2.4	2.4	2.4
Resources were/are available	2.3	2.4	2.1	*2.5
Time was/is available for key	2.1	1.9	2.1	2.2
Rewards or incentives were/are available	1.7	2.0	1.6	1.6
Opportunities were/are available	2.4	2.5	2.4	2.4
Participation was/is expected and encouraged	2.4	2.3	2.4	2.3
Commitment by key implementors was/is present	2.5	2.4	2.5	2.6
Leadership and continuing support was/is evident	2.6	2.3	2.6	2.6
Was/Am forced to participate	1.2	*1.5	1.1	1.2

**Significant at the 95% level for an independent T-test for means*

Conditions prompting implementation for adopting locations.

1—Not a factor in initiating implementation
2—Moderate factor in initiating implementation
3—Major factor in initiating implementation

(Mean Scores)

	Total	Urban	Rural	Suburban
Dissatisfaction with the status quo	2.6	2.5	2.6	2.6
Having people with the knowledge and skills	2.3	2.0	2.5	2.3
Resources were/are available	2.3	2.3	2.3	2.3
Time was/is available for key implementors	2.1	1.8	*2.3	2.0
Rewards or incentives were/are available	1.8	1.8	1.9	1.7
Opportunities were/are available	2.4	2.2	2.4	2.5
Participation was/is expected and encouraged	2.3	*2.0	2.4	2.3
Commitment by key implementors was/is present	2.3	*1.9	2.5	2.3
Leadership and continuing support was/is evident	2.4	2.3	2.5	2.4
Was/Am forced to participate	1.2	1.4	1.2	1.3

**Significant at the 95% level for an independent T-test for means*

***Levels of technology use* achieved by adopting locations.**

	Total	Urban	Rural	Suburban
Takes action to learn more detailed information	19.7%	18.8%	15.1%	*25.2%
Makes a decision to use the technology and sets a time to begin	14.3%	10.9%	14.4%	14.6%
Works step-by step to master the features of the technology	12.2%	14.2%	12.1%	11.2%
At a routine pattern of use	23.2%	15.5%	29.4%	18.7%
Evaluates the technology and makes adaptations	7.8%	6.7%	7.3%	8.9%
Collaborates with colleagues to adapt the use of the technology to meet individual needs	11.9%	19.2%	11.4%	10.7%
Explores alternatives for major modifications to broaden the technology's use	10.0%	16.6%	8.8%	10.0%

**Significant at the 95% level for an independent Z-test for percentages*

***Levels of technology use* achieved by adopting locations.**

	Total	1992	1993	1994
Takes action to learn more detailed information	19.7%	16.9%	21.2%	20.0%
Makes a decision to use the technology and sets a time to begin	14.3%	9.4%	14.4%	*18..5%
Works step-by step to master the features of the technology	12.2%	13.6%	9.0%	13.8%
At a routine pattern of use	23.2%	24.6%	25.5%	20.5%
Evaluates the technology and makes adaptations	7.8%	8.7%	*9.4%	5.2%
Collaborates with colleagues to adapt the use of the technology to meet individual needs	11.9%	14.8%	10.0%	13.2%
Explores alternatives for major modifications to broaden the technology's use	11.9%	11.2%	8.5%	15.7%

**Significant at the 95% level for an independent Z-test for percentages*

Approximate number of hours during the school year that you spend on dissemination activities...(hours per month)

(Mean Scores)

	Total	Urban	Rural	Suburban
Released time by your school/district	6.9	4.1	7.8	7.0
Planning time allowed as part of the school day	9.7	3.8	5.6	*15.5
Personal time	16.7	16.9	13.5	19.9
Total hours per month during the school year	32.5	24.6	25.6	*42.2

Significant at the 95% level for an independent T-test for means

Approximate number of hours during the school year that you spend on dissemination activities...(hours per month)

(Mean Scores)

	Total	1992	1993	1994
Released time by your school/district	6.9	7.4	7.6	11.8
Planning time allowed as part of the school day	9.7	8.0	*14.9	6.7
Personal time	16.7	12.7	19.4	17.8
Total hours per month during the school year	32.5	28.0	37.4	32.9

Significant at the 95% level for an independent T-test for means

Approximate number of hours <u>during the summer</u> that you spend on dissemination activities...(hours per month)

(Mean Scores)

	Total	Urban	Rural	Suburban
Released time by your school/district	4.7	*18.0	2.8	3.9
Planning time allowed as part of the school day	6.4	6.0	3.5	9.7
Personal time	21.3	31.3	17.0	23.9
Total hours per month during the school year	32.4	55.3	23.4	37.5

Significant at the 95% level for an independent T-test for means

Approximate number of hours <u>during the summer</u> that you spend on dissemination activities...(hours per month)

(Mean Scores)

	Total	1992	1993	1994
Released time by your school/district	4.7	6.4	1.8	6.4
Planning time allowed as part of the school day	6.4	4.0	12.0	3.2
Personal time	21.3	17.4	25.6	20.9
Total hours per month during the school year	32.4	27.8	39.5	30.6

Significant at the 95% level for an independent T-test for means

Approximate <u>percentage of time</u> dedicated to dissemination activities

	Total	Urban	Rural	Suburban
Obtaining funding	13.2%	*16.8%	*16.4%	8.4%
Awareness	21.5%	18.2%	19.6%	24.6%
Planning	21.3%	17.4%	20.0%	23.1%
Evaluation	7.7%	7.1%	9.0%	6.9%
Consulting	18.2%	15.6%	17.3%	20.1%
Actual Adoption	15.3%	18.8%	14.7%	15.3%

Significant at the 95% level for an independent Z-test for percentages

Approximate <u>percentage of time</u> dedicated to dissemination activities

	Total	1992	1993	1994
Obtaining funding	13.2%	11.4%	9.3%	*17.5%
Awareness	21.5%	16.5%	*27.5%	20.7%
Planning	21.3%	19.8%	*24.7%	18.8%
Evaluation	7.7%	8.6%	8.6%	6.5%
Consulting	18.2%	18.4%	*21.3%	15.7%
Actual Adoption	15.3%	*18.2%	8.1%	*19.7%

Significant at the 95% level for an independent Z-test for percentages

Level of activity of technology use at adopting locations

1—Not Active
2—Somewhat Active
3—Moderately Active
4—Very Active

(Mean Scores)

	Total	Urban	Rural	Suburban
Knowing the characteristics and capability of the technology	2.69	2.57	2.72	2.72
Seeking information about the technology in a variety of ways	2.96	2.57	2.93	*3.08
Discussing outcomes, plans, ideas, and problems related to the use of the technology	2.91	2.80	3.02	2.83
Assessing the strengths, weaknesses, or actual use of the technology	2.58	2.53	2.60	2.59
Carrying out the actions and activities entailed in the adoption of the educational technology	2.77	2.93	2.78	2.73
Organizing and coordinating the steps leading to technology adoption	2.73	2.67	2.79	2.69

Significant at the 95% level for an independent T-test for means

Level of activity of technology use at adopting locations

1—Not Active
2—Somewhat Active
3—Moderately Active
4—Very Active

(Mean Scores)

	Total	1992	1993	1994
Knowing the characteristics and capability of the technology	2.69	2.72	2.75	2.57
Seeking information about the technology in a variety of ways	2.96	3.00	3.00	2.90
Discussing outcomes, plans, ideas, and problems related to the use of the technology	2.91	2.73	2.98	3.00
Assessing the strengths, weaknesses, or actual use of the technology	2.58	2.39	2.58	*2.77
Carrying out the actions and activities entailed in the adoption of the educational technology	2.77	2.85	2.82	2.67
Organizing and coordinating the steps leading to technology adoption	2.73	2.80	*2.91	2.52

Significant at the 95% level for an independent T-test for means

How did dissemination plans align themselves with your goals?

	Total	Urban	Rural	Suburban
Followed plan as developed	6.5%	0.0%	6.6%	8.5%
Followed plans with modifications in timelines and/or budget	46.4%	40.0%	36.1%	*59.3%
Modified plans to respond to broader goals	25.4%	20.0%	31.1%	20.3%
Modified plans due to unrealistic goals	5.8%	13.3%	6.6%	3.4%
Followed most aspects of the plan	12.3%	13.3%	14.8%	8.5%
Abandoned plan	2.9%	13.3%	3.3%	0.0%

Significant at the 95% level for an independent Z-test for percentages

How did <u>dissemination plans align</u> themselves with your goals?

	Total	1992	1993	1994
Followed plan as developed	6.5%	2.4%	10.6%	6.4%
Followed plans with modifications in timelines and/or budget	46.4%	46.3%	40.4%	53.2%
Modified plans to respond to broader goals	25.4%	31.7%	27.7%	17.0%
Modified plans due to unrealistic goals	5.8%	4.9%	4.3%	8.5%
Followed most aspects of the plan	12.3%	9.8%	12.8%	12.8%
Abandoned plan	2.9%	4.9%	4.3%	0.0%

Significant at the 95% level for an independent Z-test for percentages

Ratings of the <u>usefulness of initial support</u> provided by Pioneering Partners.

1—Not Useful
2—Somewhat Useful
3—Moderately Useful
4—Very Useful

(Mean Scores)

	Total	Urban	Rural	Suburban
Materials/Resources	3.62	3.12	*3.82	*3.65
Technical support	3.19	3.13	*3.40	2.96
Receiving recognition	3.57	3.12	*3.74	3.50
Financial support	3.72	3.64	*3.85	3.61
Dissemination skills development: coalition building	3.42	3.12	3.47	3.46
grant writing	3.08	2.87	3.09	3.16
presentations	3.44	2.86	*3.56	3.49
telecommunications	3.39	2.83	*3.55	3.34
dissemination planning	3.29	2.60	*3.38	*3.39
media relations	3.14	2.60	*3.34	3.08

**Significant at the 95% level for an independent T-test for means*

Ratings of the <u>usefulness of ongoing support</u> provided by Pioneering Partners.

1—Not Useful
2—Somewhat Useful
3—Moderately Useful
4—Very Useful

(Mean Scores)

	Total	Urban	Rural	Suburban
Materials/Resources	2.99	3.09	3.05	2.92
Technical support	2.84	2.91	*3.00	2.62
Receiving recognition	3.23	2.62	*3.41	*3.19
Financial support	3.19	2.92	3.24	3.27
Dissemination skills development: coalition building	3.03	2.77	3.08	3.07
grant writing	2.91	2.78	3.00	2.88
presentations	3.12	2.62	3.17	3.17
telecommunications	3.33	2.67	3.45	3.34
dissemination planning	2.89	2.40	2.88	3.02
media relations	2.85	2.80	2.96	2.76

**Significant at the 95% level for an independent T-test for means*

Level of significance that Pioneering Partners had in the dissemination of educational technologies.

	Total	Urban	Rural	Suburban
Very Significant	66.2%	35.3%	*86.7%	56.5%
Moderately Significant	23.2%	17.6%	10.0%	*37.1%
Somewhat Significant	7.0%	*29.4%	3.3%	3.2%
Not Significant	3.5%	17.9%	0.0%	3.2%
Mean Scores	3.52	2.71	*3.83	3.47

**Significant at the 95% level for an independent Z-test for percentages*

Level of significance that Pioneering Partners had in the dissemination of educational technologies.

	Total	1992	1993	1994
Very Significant	66.2%	63.6%	69.6%	67.3%
Moderately Significant	23.2%	25.0%	21.7%	22.4%
Somewhat Significant	7.0%	6.8%	6.5%	6.1%
Not Significant	3.5%	4.5%	2.2%	4.1%
Mean Scores	3.52	2.71	*3.83	3.47

**Significant at the 95% level for an independent Z-test for percentages*

Appendix C

References

References

Bogdan, Robert C. and Sari Knopp Bilken, 1982. Qualitative Research for Education: An Introduction to Theory and Methods. Boston: Allyn & Bacon.

Cronbach, Lee, J., 1982. Designing Evaluations of Educational and Social Programs. San Francisco, CA: Jossey-Bass

Ely, Donald P., 1990. "Conditions that Facilitate the Implementation of Educational Technology Innovations." Journal of Research on Computing in Education, 23, 2, Winter.

Ely Donald P., and A. Michael Huberman. User-Friendly Handbook for Project Dissemination. National Science Foundation's Directorate for Education and Human Resource Development.

Goals 2000: Educate America Act, 1994. U.S. Department of Education, Washington, DC.

Hall, Gene E., et al., 1975. "Level of Use of the Innovation: A Framework for Analyzing Innovation Adoption." Journal of Teacher Education, 26, 1, Spring.

Miles, Matthew B., and A. Michael Huberman, 1984. Qualitative Data Analysis. Newbury Park, CA: Sage.

Nelson, Barbara H., Iris R. Weiss and Larry E. Conaway, 1992. Science and Mathematics Education Briefing Book, National Science Teachers Assoc, Vol. 3, Washington, DC.

Patton, Michael Quinn, 1990. Qualitative Evaluation and Research Methods. 2nd ed. Newbury Park, CA: Sage.

Pathways to Excellence - A Federal Strategy for Science Mathematics, Engineering and Technology Education, 1993. Federal Coordinating Council for Science, Engineering, and Technology.

Scriven, Michael, 1991. Evaluation Thesaurus. 4th ed. Newbury Park, CA: Sage.

Stake, Robert, Liora Bresler and Linda Mabry, 1991. Custom and Cherishing: The Arts in the Elementary Schools. Urbana: University of Illinois, Council for Research in Music Education.

Williams, David D., 1986. Naturalistic Evaluation. New Directions for Program Evaluation, No. 30. San Francisco: Jossey-Bass.

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